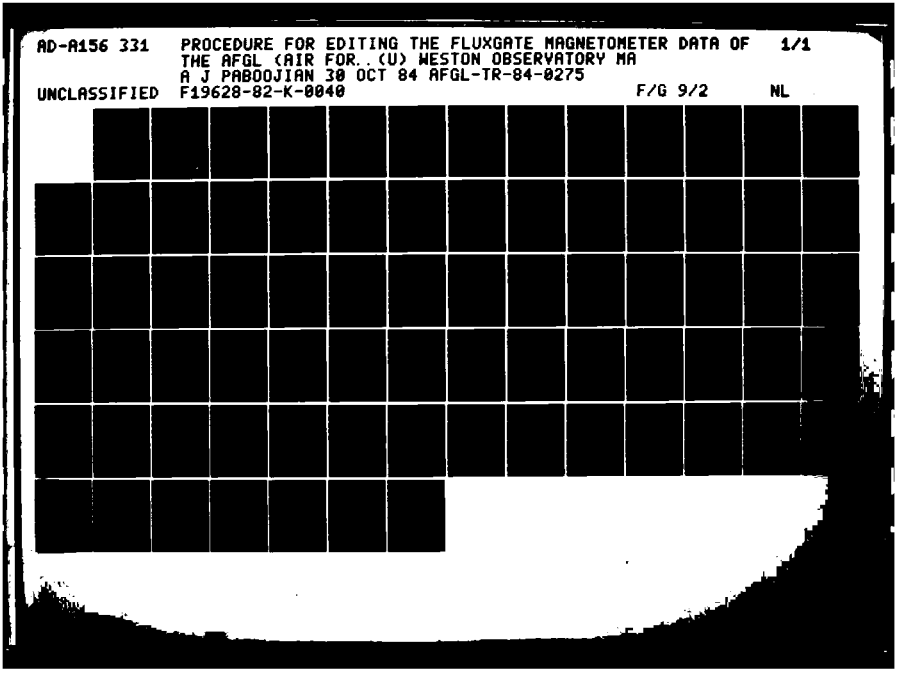
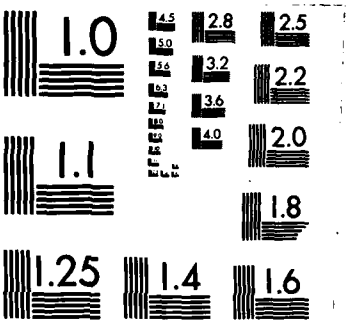

AD-A156 331 PROCEDURE FOR EDITING THE FLUXGATE MAGNETOMETER DATA OF 1/1
THE AFGL (AIR FOR..(U) WESTON OBSERVATORY MA
A J PABOOJIAN 30 OCT 84 AFGL-TR-84-0275
UNCLASSIFIED F19628-82-K-0040 F/G 9/2 NL



AFGL-TR-84-0275

PROCEDURE FOR EDITING THE FLUXGATE MAGNETOMETER DATA OF THE AFGL MAGNETOMETER NETWORK

Armand J. Paboojian

Weston Observatory
Dept. of Geology and Geophysics
Boston College
381 Concord Road
Weston, MA 02193

October 1984

Scientific Report No. 1

Approved for public release; distribution unlimited

AIR FORCE GEOPHYSICS LABORATORY
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
HANSCOM AFB, MASSACHUSETTS

"This technical report has been reviewed and is approved for publication"

DAVID J. KNECHT
Contract Manager

WILLIAM J. BURKE
Branch Chief

Accession For	
NTIS GRA&I	☒
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A/1	

FOR THE COMMANDER

RITA C. SAGALYN
Division Director

This report has been reviewed by the ESD Public Affairs Office (PA) and is releasable to the National Technical Information Service (NTIS).

Qualified requestors may obtain additional copies from the Defense Technical Information Center. All others should apply to the National Technical Information Service.

If your address has changed, or if you wish to be removed from the mailing list, or if the addressee is no longer employed by your organization, please notify AFGL/DAA, Hanscom AFB, MA 01731. This will assist us in maintaining a current mailing list.

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED TO DTIC CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE

REPORT DOCUMENTATION PAGE

1a. REPORT SECURITY CLASSIFICATION Unclassified	1b. RESTRICTIVE MARKINGS
2a. SECURITY CLASSIFICATION AUTHORITY	3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for Public Release Distribution Unlimited
2b. DECLASSIFICATION/DOWNGRADING SCHEDULE	
4. PERFORMING ORGANIZATION REPORT NUMBER(S)	5. MONITORING ORGANIZATION REPORT NUMBER(S) AFGL-TR-84-0275
6a. NAME OF PERFORMING ORGANIZATION Weston Observatory Weston, Massachusetts 02193 6b. OFFICE SYMBOL (If applicable)	7a. NAME OF MONITORING ORGANIZATION Air Force Geophysics Laboratories
6c. ADDRESS (City, State and ZIP Code) 381 Concord Road Weston, Massachusetts 02193	7b. ADDRESS (City, State and ZIP Code) Hanscom AFB, MA 01731
8a. NAME OF FUNDING/SPONSORING ORGANIZATION Same as 7a 8b. OFFICE SYMBOL (If applicable)	9. PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER F19628-82-K-0040
8c. ADDRESS (City, State and ZIP Code)	10. SOURCE OF FUNDING NOS. PROGRAM ELEMENT NO.: 62101F; PROJECT NO.: 7601; TASK NO.: 08; WORK UNIT NO.: AS
11. TITLE (Include Security Classification) "Procedure for Editing the Fluxgate Magnetometer Data of the AFGL Magnetometer Network"	
12. PERSONAL AUTHOR(S) Armand J. Paboojian	
13. TYPE OF REPORT: Scientific No. 1 13b. TIME COVERED: FROM 07/01/83 TO 09/28/84	14. DATE OF REPORT (Yr., Mo., Day): 84/10/30 15. PAGE COUNT: 74
16. SUPPLEMENTARY NOTATION	
17. COSATI CODES FIELD: 08; GROUP: 14; SUB. GR.:	18. SUBJECT TERMS (Continue on reverse if necessary and identify by block number) Magnetograms Computer Programs Usage of Special Programs, AFGL Magnetometer Network

19. ABSTRACT (Continue on reverse if necessary and identify by block number)

The procedure for producing the edited data base of the AFGL Magnetometer Network is described in detail. The input to the procedure is the series of archive tapes on which the raw data from the seven network stations are recorded; the output is several series of tapes containing the edited data from the fluxgate magnetometer only. Each series has either a one-second or a one-minute (averaged) sampling interval and is written in a tape format selected for compatibility with one or more specific computer types used at the Air Force Geophysics Laboratory, The World Data Center, and other scientific institutions. Detailed instructions are given for the execution of each of the computer programs employed in the procedure as well as for the basic operation of the network minicomputer on which the procedure is carried out. The procedure is highly automated and the description provided is sufficient to permit its being carried out by an untrained operator.

20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED ☒ SAME AS RPT. ☐ DTIC USERS ☐	21. ABSTRACT SECURITY CLASSIFICATION UNCLASSIFIED
22a. NAME OF RESPONSIBLE INDIVIDUAL Dr. David Knecht	22b. TELEPHONE NUMBER (Include Area Code) 617-861-3828 22c. OFFICE SYMBOL AFGL/PHG

DD FORM 1473, 83 APR EDITION OF 1 JAN 73 IS OBSOLETE.

SECURITY CLASSIFICATION OF THIS PAGE

ACKNOWLEDGEMENTS

I would like to thank Dr. Dave Knecht for his patience, consideration, and advice in the preparation of this instruction manual. Also, Fr. Devane's support during this writing is appreciated. Finally, I would like to thank the many people who were involved in the process of editing tapes because many of the examples in this manual were provided from their work.

Table of Contents

I. GENERAL INFORMATION ON THE VARIAN 72 COMPUTER

I.A Use of this Manual

This manual is divided into two sections. The first is an introduction to the use of the Varian 72 (V72) computer. The second involves the description of the programs used in the process for preparing edited tapes for the Air Force Geophysics Laboratory, the World Data Center, and other institutions.

My recommendations for the use of this manual are as follows. First, if one has no familiarity at all with the V72, then I highly recommend one to read section I, GENERAL INFORMATION ON THE VARIAN 72 COMPUTER, thoroughly. Second, if one does have some knowledge of the operation of the V72 computer, then one should use section I only as a reference. Third, if one desires to process tapes and is not familiar with the procedure, then one should read section II, EDITING MAGNETOMETER NETWORK DATA. Also, in section II.A there is a brief description of the processing procedure along with the features and functions of each program in all of section II. The programs have been explained so that if one wishes to learn about the CMB PROGRAM, then one can just read the part about the CMB PROGRAM and nothing else to execute it. Also, one should read a program thoroughly to learn about all the possible options that are available, and possible situations in which the program can be used. Fourth, I recommend any user of the V72 computer to read this entire manual to learn what kinds of programs and commands are available, because they might be helpful to whatever operation one is conducting on the computer although indirectly related.

I.B Types of Commands: OPCOM and JCP

There are basically two types of commands (requests) to operate the V72 computer. A request to the Operator Communicator (OPCOM) begins with a semicolon (;). A request to the Job Control Processor (JCP) begins with a forward slash (/). OPCOM is generally more powerful than JCP. For example whenever requesting most background programs a JCP command is used, and to abort background programs an OPCOM command is used. All the programs discussed are background programs.

The OPCOM command runs foreground programs and the JCP command runs background programs. More than one foreground program can be run at a time, whereas only one background program can be run at a time. Foreground programs have higher priority than background programs. Section I of this manual will deal with OPCOM Commands (ABORT, ASSIGN, DEVDN, DEVUP, and IOLIST, TSTAT), and the rest of the manual will deal with JCP commands.

One important function by an operator of the V72 computer is pressing the return. One assumes that to send a keyboard input to the computer one must press the return. For example to communicate with the computer one must press the return to enter a command, press the return after entering a response to a question so the computer receives the information, and press the return after all the questions of a program so the computer can begin execution. Thus, throughout this manual whenever a communication occurs with the computer pressing the return will be assumed, and thus not mentioned. Also, when a question is asked which requires a number as the response and no response is entered from the teletype terminal followed by a return, the response to the question would be the same as if a Ø was entered from the teletype terminal. Finally, when a question is asked which requires a letter as the response one should answer it, otherwise when one proceeds by pressing the return the question will be filled with a blank response.

Another important fact about using the V72 computer is that whenever a (/) is typed followed by a return or a (/) is typed and a program name followed by a return, then one will hear a beep sound. This beep sound will also be heard whenever the return is pressed after a question in a program or when a plot has been completed on the teletype screen. The beep sound is an indication that the computer is either ready or waiting for input. One should always wait to hear the beep after a return; one should <u>not</u> press the return again until the beep sound occurs first. Otherwise, a problem may occur where the JCP becomes hung up and then nothing can be executed from the teletype terminal. To solve this problem one can type ;ABORT,JCP this may put the computer into a form again where one can execute programs from the teletype terminal. However, sometimes this solution will not correct the problem and then one will have to reboot the system, which will be discussed in section I.F.

The programs are stored on disk in various libraries. Some are in the background library (BL) and the rest are in alternate libraries as shown in figure 1. The easiest type of program to request is one located in the background library. The following would be conducted to request a program on the background library

```
/(NAME OF PROGRAM)
```

For example

```
/WA5                or          /PM
```

If a program is located in one of the alternate libraries then the procedure is slightly different as follows

```
/ALTLIB,(NAME OF LIBRARY)
  JC**  <-- Computer Response
/(NAME OF PROGRAM)
```

For example

```
/ALTLIB,D2
  JC**  <-- Computer Response
/CV2
```

To abort a program the OPCOM command ABORT is used

```
;ABORT,(NAME OF PROGRAM)
  JC**  <-- Computer Response
```

For example

```
;ABORT,WA5          or          ;ABORT,CV2
  JC**  <-- Computer Response      JC** <-- Computer Response
```

FILE DIRECTORY FOR LUN B1

FILE NAME	START	END	CURRENT
FMAIN	3	103	103
IOUTIL	103	144	144
USORT	144	223	223
EDIT	223	262	262
DUMP2T	262	472	472
D	262	472	472
PROTEC	472	475	475
TAPLOG	475	624	624
TAPDUP	624	723	723
LINCHK	723	1116	1116
DISKNU	1116	1162	1162
SBOOT	1162	1175	1175
RELINK	1175	1214	1214
LMGEN	1214	1314	1314
DASMR	1314	1442	1442
JCP	1442	1477	1477
FORT	1477	1776	1776
V$ACT3	1776	2002	2002
V$ACT1	1776	2002	2002
V$ACT2	1776	2002	2002
ASM	2002	2064	2064
FTN	2002	2064	2064
NUFILE	2064	2216	2216
ARCOPY	2216	2222	2222
FC3	2222	2652	2652
PS	2652	3242	3242
PM	3242	3535	3535
UAS	3535	4155	4155
%UNAS%	4155	5121	

FILE DIRECTORY FOR LUN B2

FILE NAME	START	END	CURRENT
IMP	2	114	101
KPR	114	222	222
KPS	222	352	352
CMB	352	467	467
TCV	467	643	643
RGN	643	1033	1033
CV2	1033	1165	1165
IMC	1165	1321	1321

FILE DIRECTORY FOR LUN B5

FILE NAME	START	END	CURRENT
MAGINT	2	221	221
CHANGE	221	274	274
ARCOPY	274	330	330
ARCHIV	330	342	342
DUMP2	342	517	517
RTCOIL	517	601	600
SHU	601	754	754
UASDS	754	1331	1331
CAT	1331	1751	1751
SXAT40	1751	2021	2012
M2	2021	2033	2026
AS12	2033	2045	2034
TEST	2045	2071	2062
AP2	2071	2242	2242
AP1	2242	2412	2412
DF1	2412	2556	2516
DP1	2556	2722	2657
DD1	2722	3066	3031
%UNAS%	3066	3221	

FILE DIRECTORY FOR LUN B0

FILE NAME	START	END	CURRENT
JUNK	3	313	10
PLOTFL	313	1443	710
DSCFL1	313	1443	723
DSCFL2	1443	2263	1766
DSCFL3	2263	3021	2264
DSCFLA	2263	3021	2775
DSCFLB	3021	3557	3021
S1	3557	3615	3573
SI	3615	3653	3632
BLD	3653	3742	3742
DTR	3742	4101	4101
ARMAND	4101	4543	4540
FIND	4543	4707	4707
ACC	4707	4776	4776
SSS	4776	5435	5435
SPRINT	5435	5660	5660
FPRINT	5660	6102	6102
TEMP	6102	6302	6302
LACE	6302	6401	6401
FILT	6401	6617	6617
PLOT	6617	7066	7066
SCREEN	7066	7172	7172
MAGM	7172	7334	7334
READ	7334	7755	7755
MODO	7755	10303	10303
REXP	10303	10542	10542
SHS	10542	10756	10756
AP4	10756	11116	11116
%UNAS%	11116	11301	

FILE DIRECTORY FOR LUN B4

FILE NAME	START	END	CURRENT
SI	2	64	54
XTR	64	227	227
DATA	227	356	356
UA	356	443	443
XFR	443	526	526
SH4	526	732	732
TCA	732	1043	1043
TUCK	1043	1162	1162
%UNAS%	1162	1321	

FILE DIRECTORY FOR LUN B1

FILE NAME	START	END	CURRENT
MAGNT2	2	5	5
MID	5	20	20
U$OPCM	20	71	71
JPDUMP	71	100	100
RACI	100	144	144
PATCH	144	170	170
BTPTCH	170	175	175
PTCHIM	175	207	207
DEBUG	207	221	221
ARCTMP	221	253	253
MAGINT	253	306	306
FR	306	356	353
%UNAS%	356	1701	

Figure 1: A listing of the programs on various libraries as of September 1984.

I.C Types of Error Messages: I03Ø, I0ØØ, and I014

At this point in this manual three types of error messages, which come from the computer operating system (I03Ø, I0ØØ, and I014), that commonly occur will be discussed.

The parity error (labeled as I03Ø on the teletype screen) is the most frequent error of the three types. A parity error is an error which may occur while reading or writing a tape. This error can best be explained by the following example. A tape may have written on it an illegible record because there may be a bad spot on the tape, or dirt on the tape head, or some malfunction by the computer. Whenever this tape is read the parity error will appear as an I03Ø on the teletype screen. This is a peculiar error because it does not always show up on the teletype screen or on the Taplog. For example a tape may be read on a tape unit and there would be no sign of a parity error on the teletype screen or on the Taplog; but then at some other time, possibly when reading the tape on a different tape drive, a parity error will appear on the teletype screen and/or on the Taplog. An important point is that when the computer is executing a program and it encounters a parity error then the I03Ø message will appear on the teletype screen; and in some cases the program itself will give a message on the teletype screen in addition to the message from the operating system.

The I0ØØ error indicates that a device is not available, which could happen when the tape unit is not put on line and/or by checking the IOLIST (discussed in section I.D) one may see that the device is down. This error will continue to occur because the computer will always try to input/ouput until it succeeds. An example of this error and its solution is discussed on page and shown in figure 3.

The I014 error occurs usually when the computer tries to write on a tape and it cannot, because the write ring has been removed from the tape. Thus, to eliminate this error one can place a write ring in the groove of the back of the tape and then proceed. There are other causes of this error but they will not be discussed because these causes occur rarely.

I.D Checks of Computer Status: IOLIST, TSTAT, and (/)

Three important checks one should do whenever one begins and finishes working with the V72 Computer are:

CHECK #1

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    S0 (100)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY06
    PI (004)= D00L
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SU (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

CHECK #2

```
;TSTAT
  V$SCPT P30 S047401, 000000
  V$SAL  P26 S047401, 000000
  VZDB   P24 S047401, 000000
  V$TYA  P23 S047411, 000000
  VZUCA  P22 S047511, 000000 TM 077777 TS 077555
  VZSP0A P22 S047401, 000000
  V$CLPS P22 S047401, 000000
  VZMTA  P22 S047401, 000000
  V$SPLP P21 S047511, 000100 TM 077777 TS 077337
  V$OPCM P10 S005405, 020000
  JCP    P01 S044400, 000000
```

CHECK #3

```
/
 JC01
 JC##
```

The IOLIST (input/output list from computer to peripheral units: teletype screen, tape unit, etc.) can be used for three purposes: to check whether the devices are up or down, whether DU is assigned to the proper device, and whether LS is assigned to the proper output unit.

There are three devices MTØØ, MTØ1, and MTØ2, each of which is a tape unit. The IOLIST in column 1 of figure 2 has listed the various devices. One needs to check whether the devices are up or down; if a device is down then any tape mounted on that tape unit cannot be read from or written to. Comparing the IOLIST in the first column to that in the second column of figure 2, one can see that in the second column MTØ2 is down by noticing the D (DOWN) printed next to it. To bring the device back up for use one should type

```
;DEVUP,MTØ2
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    SO (180)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D00L
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SU (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    SO (180)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D00L
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SU (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    SO (180)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D00L
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SU (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

Figure 2

which stands for DEVICE UP MTØ2. Then if one checks the IOLIST again one can see that device MTØ2 is now up as shown in column 3 of figure 2; thus, it can now be used again from the teletype terminal.

In general the devices should always be up and ready for use. However, there is an exception. Sometimes when one tries to execute a program a problem may arise and one method to solve the problem is by bringing the device down by typing

```
;DEVDN,MTØ2
```

which stands for DEVICE DOWN MTØ2. For example, if one tries to read a blank tape with a program like TAPLOG a problem will result because the computer will fail to read to any device and simply typing ;ABORT,TAPLOG will not suffice; one must bring the device down to abort the program and then bring the device up again. The procedure for this example is shown in figure 3.

```
/TAPLOG
 ENTER INPUT UNIT: 1,2,3 FOR M1,M2,M3.
3

 SIGN FOR SINGLE PRINT SS3 FOR ALL PRINT, SS2 TO LOG GAPS.

  1000, MT00
  1000, MT00
  1000, MT00
;DEVDN,MT00
  1000, MT00
  1000, MT00
  1001, TAPLOG
  JC##

;DEVUP,MT00
```

Figure 3

Many programs ask which tape units to read from and/or write on which can easily be answered by typing in the number of the tape unit as requested usually (M1, M2, or M3); however, some programs assume the tape is on device DU and do not ask which tape unit. In this case the tape is read on whatever tape unit DU is assigned to, MTØØ usually. Looking at the IOLIST in column 1 of figure 4 one notices that DU is assigned to its appropriate tape unit, MTØØ. If one desires to read a tape on a device where DU is not assigned, then one can assign DU to the device of one's choice. For example to read a tape on MTØ1 one should type

```
;ASSIGN,DU,MTØ1
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    S0 (180)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D01F
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SW (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    S0 (180)= LP00
    PL (050)= D01E
    DU (039)= MT01
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D01F
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SW (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

```
;IOLIST
    DD (060)= UC00
    P1 (015)= LP00
    M3 (023)= MT00
    M2 (022)= MT01
    M1 (021)= MT02
    SX (107)= D01B
    S0 (180)= LP00
    PL (050)= D01E
    DU (039)= MT00
    LS (024)= TY00
    D7 (037)= D01G
    D6 (036)= D01F
    D5 (035)= D00J
    D4 (034)= D01D
    D3 (033)= D00L
    D2 (032)= D01C
    D1 (031)= D00K
    D0 (030)= D01A
    OC (001)= TY00
    SI (002)= TY00
    SO (003)= TY00
    PI (004)= D00L
    LO (005)= TY00
    BI (006)= D00I
    BO (007)= D00I
    SS (008)= D00H
    GO (009)= D00G
    PO (010)= D00H
    DI (011)= TY00
    DO (012)= TY00
    CU (101)= D00E
    SW (102)= D00F
    CL (103)= D00A
    OM (104)= D00D
    BL (105)= D00C
    FL (106)= D00B
```

Figure 4

Then checking the IOLIST in column 2 of figure 4 one notes that DU is now assigned to MTØ1. Remember that whenever dealing with a program that reads from DU check the IOLIST before requesting the program, and whenever finishing with a program that reads from or writes on DU check the IOLIST to make sure that DU is assigned to the usual device MTØØ, and if it is not then assign it to that device by typing

```
;ASSIGN,DU,MTØØ
```

then checking the IOLIST in column 3 of figure 4 one notes that DU is assigned back to its usual device. Also, whenever the system is rebooted (discussed in section I.F) DU is assigned to its usual device MTØØ.

Some programs depend on the assignment of LS for data printout to a certain unit. Looking at the IOLIST in column one of figure 5 one notices that LS is assigned to its appropriate unit, TYØØ. When LS is assigned to TYØØ the printout for certain programs, for example DUMP2, are printed on the on the teletype screen. Also, such programs can be printed on the line printer and to do so one should type

```
;ASSIGN,LS,SPØØ
```

then checking the IOLIST in column 2 of figure 5 one notes that LS is assigned to SPØØ. Remember that whenever dealing with a program whose printout depends on LS assignment check the IOLIST before requesting the program, and whenever finishing with a program that prints out according to LS assignment check the IOLIST to make sure that LS is assigned back to its usual printout unit TYØØ, and if it is not then assign it to that unit by typing.

```
;ASSIGN,LS,TYØØ
```

then checking the IOLIST in column 3 of figure 5 one notes that LS is assigned back to its usual unit. Also, whenever the system is rebooted (discussed in section I.F) LS is not returned to its usual unit but to SPØØ; thus, LS has to be assigned to its usual unit.

In summary, when using the IOLIST check to see that all the devices are up before and after using the computer. Use the IOLIST to check where DU is before using a program that reads from or writes on DU, and when finished assign DU back to MTØØ if it is not already there. Finally, check LS before using a program whose printout depends on the assignment of LS.

```
;IOLIST
     DD (060)= UC00
     P1 (015)= LP00
     M3 (023)= MT00
     M2 (022)= MT01
     M1 (021)= MT02
     SX (107)= D01B
     S0 (180)= LP00
     PL (050)= D01E
     DU (039)= MT00
     LS (024)= TY00
     D7 (037)= D01G
     D6 (036)= D01F
     D5 (035)= D00J
     D4 (034)= D01D
     D3 (033)= D00L
     D2 (032)= D01C
     D1 (031)= D00K
     D0 (030)= D01A
     OC (001)= TY00
     SI (002)= TY00
     SO (003)= TY00
     PI (004)= D01F
     LO (005)= TY00
     BI (006)= D00I
     BO (007)= D00I
     SS (008)= D00H
     GO (009)= D00G
     PO (010)= D00H
     DI (011)= TY00
     DO (012)= TY00
     CU (101)= D00E
     SW (102)= D00F
     CL (103)= D00A
     OM (104)= D00D
     BL (105)= D00C
     FL (106)= D00B
```

```
;IOLIST
     DD (060)= UC00
     P1 (015)= LP00
     M3 (023)= MT00
     M2 (022)= MT01
     M1 (021)= MT02
     SX (107)= D01B
     S0 (180)= LP00
     PL (050)= D01E
     DU (039)= MT00
     LS (024)= SP00
     D7 (037)= D01G
     D6 (036)= D01F
     D5 (035)= D00J
     D4 (034)= D01D
     D3 (033)= D00L
     D2 (032)= D01C
     D1 (031)= D00K
     D0 (030)= D01A
     OC (001)= TY00
     SI (002)= TY00
     SO (003)= TY00
     PI (004)= D00L
     LO (005)= TY00
     BI (006)= D00I
     BO (007)= D00I
     SS (008)= D00H
     GO (009)= D00G
     PO (010)= D00H
     DI (011)= TY00
     DO (012)= TY00
     CU (101)= D00E
     SW (102)= D00F
     CL (103)= D00A
     OM (104)= D00D
     BL (105)= D00C
     FL (106)= D00B
```

```
;IOLIST
     DD (060)= UC00
     P1 (015)= LP00
     M3 (023)= MT00
     M2 (022)= MT01
     M1 (021)= MT02
     SX (107)= D01B
     S0 (180)= LP00
     PL (050)= D01E
     DU (039)= MT00
     LS (024)= TY00
     D7 (037)= D01G
     D6 (036)= D01F
     D5 (035)= D00J
     D4 (034)= D01D
     D3 (033)= D00L
     D2 (032)= D01C
     D1 (031)= D00K
     D0 (030)= D01A
     OC (001)= TY00
     SI (002)= TY00
     SO (003)= TY00
     PI (004)= D01F
     LO (005)= TY00
     BI (006)= D00I
     BO (007)= D00I
     SS (008)= D00H
     GO (009)= D00G
     PO (010)= D00H
     DI (011)= TY00
     DO (012)= TY00
     CU (101)= D00E
     SW (102)= D00F
     CL (103)= D00A
     OM (104)= D00D
     BL (105)= D00C
     FL (106)= D00B
```

Figure 5

The TSTAT indicates the task status of the computer. For example when no program has been requested, the TSTAT appears as it does in the upper-half of figure 6. There are eleven lines; the first ten begin with a 'V' and the last line with JCP. When a program like IMC is being executed the TSTAT will appear as it does in the lower-half of figure 6, where the first eleven lines are the same as before, but now there is a twelfth line which is the name of the program being executed. Thus, the TSTAT can be used to see whether a program is being executed or not.

The forward slash (/) can also be used to check whether or not a background program is being executed. For example if a program is not being executed then when one types

```
/
 JCØ1    <-- Computer Response
 JC**    <--     "         "
```

If the JCP is busy, for example when a background program is being executed, then when one types

```
/
```

there will be no response from the computer.

As a useful method, the (/) can sometimes be used to abort a background program, only. When a question of a background program is being asked responding with the (/) key will abort the program. Once the question(s) have been asked and the program is running a (/) cannot be used to abort it, only by typing ;ABORT,(NAME OF PROGRAM) will the program abort. An example of this procedure is illustrated in figure 7.

```
/TMPLOG
 ENTER INPUT UNIT: 1,2,3 FOR M1,M2,M3.
/
  1013, TMPLOG
  JC01
  JC88

/TMPLOG
 ENTER INPUT UNIT: 1,2,3 FOR M1,M2,M3.
3
 SIGN FOR SINGLE PRINT 553 FOR ALL PRINT, 552 TO LOG GAPS.

 SEQ   8159 20:20:50 FOLLOWS  0  0  01 01 0     0
/

 SEQ   8159 20:50:30 FOLLOWS  8159 20:50:1 0    39
 SEQ   8159 21: 0:10 FOLLOWS  8159 20:50:40    55
;ABORT,TMPLOG
  JC88
```

Figure 7

```
;TSTHT
  U$SCPT P30 S047401, 000000
  U$SHL  P26 S047401, 000000
  UZDB   P24 S047401, 000000
  U$TYH  P23 S047411, 000000
  UZUCA  P22 S047511, 000000 TH 077777 TS 077445
  UZSPOH P22 S047401, 000000
  U$CLPS P22 S047401, 000000
  UZMTH  P22 S047401, 000000
  U$SPLP P21 S047511, 000100 TH 077777 TS 077774
  U$OPCM P10 S005405, 020000
  JCP    P01 S044400, 000000
```

```
;TSTHT
  U$SCPT P30 S047401, 000000
  U$SHL  P26 S047401, 000000
  UZDB   P24 S047401, 000000
  U$TYH  P23 S047411, 000000
  UZUCA  P22 S047511, 000000 TH 077777 TS 077713
  UZSPOH P22 S047401, 000000
  U$CLPS P22 S047401, 000000
  UZMTA  P22 S047401, 000000
  U$SPLP P21 S047511, 000100 TH 077777 TS 077471
  U$OPCM P10 S005405, 020000
  JCP    P01 S044400, 000000
  IMC    P00 S100001, 000000
```

Figure 6

One final item of importance to be mentioned is that whenever a program has completed running or whenever a program is aborted the following will be printed on the teletype screen

JC** <-- Computer Response

and this message is accompanied by a beep sound.

I.E Correcting Keyboard Entry Errors: (\) and Rub-out key

Another type of slash, the back slash (\), can be used to discard the line that was just typed. For example a line has been typed and before pressing the return key one notices a typing mistake. One can just type a (\) to cancel that line and start over. Whenever the (\) key is pressed there always is a line feed and if one uses the (\) when answering questions in a program then there also will be a return to the left margin. Examples of using the (\) are shown in figure 8.

```
/ALTKIB,D2\
          /ALTLIB,D2
  JC**


CV2 PROGRAM - MAKES IM FROM IS TAPES
   REVISION CV2.1          22 MAR 83          D.J.KNECHT
-------------------------------------------------------------
      1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
      2. PRESS RETURN TO START THE RUN, WHEN READY
--------------------- OPTION SELECTION ----------------------
   IS TAPE NUMBER: (VDDD)
3422\
3033
   INPUT TAPE UNIT (1,2,3):
2
   ---------- ---------- SETUP COMPLETE ----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN
```

Figure 8

Another technique to correct a typographical error is to enter a rub-out, but this can only be used to correct the last character typed, and the next to the last and so on. Each rub-out removes one character, working backwards from the end of the line. A rub-out is entered by depressing the shift key and then the rub-out key, and it appears on the screen as an underscore. Examples of using the rub-out are shown in figure 9.

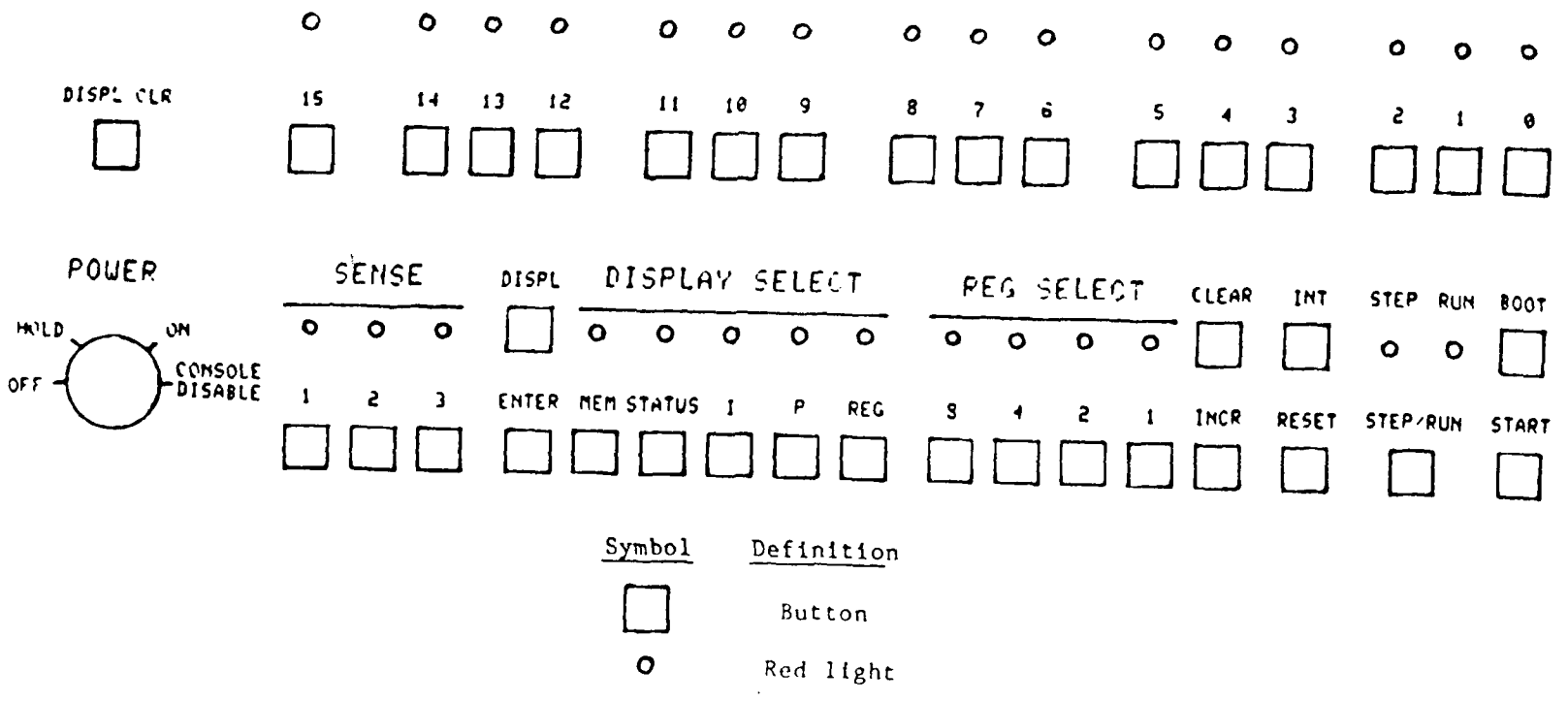
```
/WAH_5

/WSS__A5

/WS2__A5

/QA5___WA5
```

Figure 9

I.F V72 Front Panel: Sign Switch and Sense Switches

Many of the programs that are run require the use of four buttons on the V72 panel besides answering the questions. The sign switch is the button labeled 15 on the panel in figure 10, which is a diagram of the V72 panel, and it is used frequently in executing programs. The sign switch is momentary: that is, it is on by pressing and holding (the light above it will turn on); when one stops pressing it, it is off (the light above it will turn off). The sign switch when pressed sends a signal to the computer to do a certain function, which is dependent on the logic of a particular program. The sign switch can be used in a variety of ways to send a message, for example one common use is often when a new tape has to be mounted during the middle of a program. During execution of the WA5 program the archive tape being read reaches its end and begins to rewind. To continue the process the next archive tape read has to be mounted and the sign switch pressed as the statement indicates in figure 11. Also, the sign switch can be pressed to signal the computer that a blank IM tape has been mounted and is ready to be written as in figure 11.

Many programs rely on the sense switches located on the V72 panel. There are three sense switches: sense switch 1 (SS1), sense switch 2 (SS2), and sense switch 3 (SS3) as shown in figure 10. A sense switch is turned on by pressing and releasing the button (the red light above it will turn on). To turn off the sense switch one presses it and releases the button (the light above it will turn off). A sense switch, like the sign switch when pressed sends a signal to the computer to do a certain function, which is dependent on the logic of a particular program. The sense switch(es) can be used in a variety of ways to send a message, for example during execution of the WA5 program a sense switch (in this case SS1) can be used to fill out the day with blank frames as indicated in figure 11. Also, SS2 can be used to omit the IM tape after an IS tape has been written as shown in figure 11. Also, more than one sense switch can be turned on at a time during an execution of a program. Finally, if a sense switch is not used by a program, then it has no effect on the program whether it is on or off. Generally all sense switches should be turned off when not needed by the program being executed and when one has finished using the V72 computer.



Symbol	Definition
□	Button
o	Red light

Figure 10

```
                    UHS PROGRAM TO EDIT FLUXGATE DATA
          INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
          REVISION UHS.1     -     81 MAR 03     -     D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 8 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

---------------------OPTION SELECTION----------------------
YOUR OWN NAME AND DATE OF RUN    EXAMPLE: SMITH 25 FEB 82
BIC 03 MAR 84
USE PREVIOUS DATA?       (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

ONE-SECOND TAPE?         (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
ONE-MINUTE TAPE?         (1=YES)   INTERIM FOR THE UDC-A TAPE
1
INPUT TAPE UNIT:         (U)       1, 8, 3 FOR UNIT #1, #2, #3
3
OUTPUT TAPE UNIT:        (U)       1, 8, 3, BUT NOT THE INPUT
8
JULIAN DATE:             (YDDD)    YEAR AND DAY
4294
DISABLE TIME SEARCH?     (1=YES)   0=MISSING DAY (NO TAPE)
1
----------------------SETUP COMPLETE-----------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

----------------------DATA EDITOR LOG----------------------
        PROBLEM  COUNT  ISTN IOLD INEW     TIME LABEL

      START HOUR  0
      START HOUR  1
      START HOUR  2
        END          1     5   767  767  81:256:21:7:50
        STN          1     0   987  987  81:281:24:53:40
      START HOUR  3
        STN          2     0  1142 1142  81:321:21:53:40
        STN          3     0  1297 1297  81:361:21:53:40
        STN          4     0  1407 1407  81:401:23:53:40
      START HOUR  4
      START HOUR  5
        STN          5     0  1845 1845  81:501:41:53:40
        STN          6     0  8065 8065  81:581:22:53:40
      START HOUR  6
      START HOUR  7
        STN          7     0  8698 8698  81:761:41:53:40
        STN          8     0  8748 8748  81:771:11:53:40
        STN          9     0  8858 8858  81:801:09:53:40
        STN         10     0  8868 8868  81:811:01:53:40
      START HOUR  8
      START HOUR  9
        STN         11     0  3568 3568  81:1001:08:53:40
      START HOUR 10
        STN         12     0  3707 3707  81:1021:43:53:40
        ZTL          1     1  3767 3767  81:  1:01:01:0
        ZTL          2     1  3847 3847  81:  1:01:01:0
      START HOUR 11
        END          1     3  4064 4064  81:256:11:17:20
        STN         13     0  4198 4198  81:117:12:53:40
      START HOUR 12
        DAY          1     7  4588 8331  81:864:17:24:70
        DAY          2     8  4528 8331  81:864:17:24:70
        DAY          3     1  4528   24  81:  1:01:41:0
        DAY          4     2  4528   24  81:  1:01:41:0
        DAY          5     3  4528   24  81:  1:01:41:0
        DAY          6     6  4528   24  81:  1:01:41:0
        DAY          7     7  4528   24  81:  1:01:41:0
        DAY          8     9  4528   24  81:  1:01:41:0
      START HOUR 13
        ZTL          3     1  4989 4989  81:  1:01:01:0
      START HOUR 14
        STN         14     0  5156 5156  81:143:10:53:40
        END          1     1  5273 5273  81:256:11:38:50
        STN         16     0  5386 5386  81:150:42:53:40
      START HOUR 15
        MOUNT NEXT ARCHIVE TAPE AND PRESS SIGN SWITCH
        OR TURN $61 ON TO FILL OUT THE DAY WITH BLANKS
        STN         16     0  5765 5765  81:161:  8:53:40
      START HOUR 16
        TIM          1     7  5965 5971  81:256:16:34:70
        DAY          9     1  5965   24  81:  1:01:41:0
        DAY         10     2  5965   24  81:  1:01:41:0
        DAY         11     3  5965   24  81:  1:01:41:0
        DAY         12     7  5965   24  81:  1:01:41:0
      START HOUR 17
        STN         17     0  6307 6307  81:176:  9:53:40
        END          2     3  6416 6416  81:256:17:49:20
      START HOUR 18
        STN          1    -6  6722 6722  81:256:18:40:20
      START HOUR 19
        STN         18     0  6982 6982  81:192:  2:53:40
        STN          1    -6  6958 6958  81:256:19:19:40
        STN         19     0  7069 7069  81:197:  1:53:40
        STN         20     0  7116 7116  81:198:20:53:40
      START HOUR 20
        STN          1    -7  7209 7209  81:256:20:  1:50
        STN          1    -1  7211 7211  81:256:20:  1:50
        STN          2    -7  7212 7212  81:256:20:  2:  0
        STN          2    -1  7212 7212  81:256:20:  2:  0
        STN          3    -7  7213 7213  81:256:20:  2:10
        STN          3    -1  7213 7213  81:256:20:  2:10
        STN          4    -7  7214 7214  81:256:20:  2:20
        STN          4    -1  7214 7214  81:256:20:  2:20
        STN         21     0  7484 7484  81:208:14:53:40
        STN          1    -3  7495 7495  81:256:20:49:10
        STN          5    -1  7506 7506  81:256:20:51:10
      START HOUR 21
      START HOUR 22
      START HOUR 23
        ZTL          4     1  8402 8402  81:  1:01:01:0
LABEL THIS TAPE  152256
-------------------ONE-SECOND TAPE COMPLETE------------------
        MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
        OR TURN $68 ON TO OMIT THE ONE-MINUTE TAPE
----------------------ONE-MINUTE TAPE----------------------
LABEL THIS TAPE  IN2256
-------------------ONE-MINUTE TAPE COMPLETE------------------
-------------------------END OF RUN-------------------------
```

Figure 11

I.G Rebooting The System

Rebooting the system can be used as a last resort to solve many problems that cannot be solved by one of the earlier methods discussed. For example one problem that occurs sometimes is the V72 computer becomes hung up and one cannot type anything at the terminal so the system will have to be rebooted.

To reboot the system one should refer to figure 10 which is a diagram of the V72 panel. The first step in rebooting the system is to turn the key to the ON position. The second step is to press the RESET button, then the STEP/RUN button (to create a flashing run light), and then the BOOT button, in that order only. The third step is to answer the questions that will appear within 10 seconds of pressing the BOOT button.

The first question will ask whether archiving is desired and, if so, on which tape unit. If archiving is desired then either a 1 or a 2 must be entered for the appropriate tape unit. If archiving is not desired then a Ø is entered. If archiving was begun then a second question will appear asking whether or not an end of file is needed. If archiving was not begun then the second question will not appear. After the question(s) have been answered the V72 computer should be functional again from the teletype terminal. The easiest way to check whether or not it is, is to type

```
/
 JCØ1  <-- Computer response
 JC**  <--     "        "
```

If there is no computer response then there is a problem.

Finally, whenever the V72 computer is rebooted all of the physical units are reassigned to their originally programmed logical units. For example as mentioned earlier DI is reassigned to MTØØ and LS is reassigned to SPØØ.

II. EDITING MAGNETOMETER NETWORK DATA

II.A Description of steps for editing Magnetometer Data

This is a brief description of the editing process where archive tapes are edited in various steps until the final World Data Center (WDC) tape is made. At this writing the following procedure was used.

1. The WA5 program was used to write IS and IM tapes from the archive data tapes.
2. The CMB program was used to combine the IM tapes of one month into one RM tape.
3. The IMP program was used to salvage a hard-to-read IM tape by copying it.
4. The TCY program was used to make a copy of the RM tape.
5. The PM program was used to write a CM tape from the RM tape copy.
6. The WDCTAPE program on the CDC 66ØØ computer was used to write a WDC tape from the CM tapes for 3 months.

The following is a brief description of each program in this section.

WA5 PROGRAM is used for basic editing of archive tapes into IS and/or IM tapes. This program takes about 36 minutes to execute.

CV2 PROGRAM creates the data needed for an IM tape from an IS tape. Also, this program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape. This program takes about 10 minutes to execute.

IMP PROGRAM is used to attempt (5 times) to salvage a hard-to-read IM tape by copying it, hoping that you might get one pass of the program to make a successful read. Also, this program checks whether or not there is a parity error on an IM tape. This program takes about 2 minutes to execute.

IMC PROGRAM is capable of printing on the teletype screen the results of several checks made on the IM tape. This program checks the IM tape for the number of missing data points for the X, Y, and Z components for each station. Also, this program checks whether or not a tape is an IM tape, the date on an IM tape, and whether or not there is a parity error on an IM tape. This program takes about 30 seconds to execute.

CMB PROGRAM writes a RM tape from one month of IM tapes by combining them one after another. Also, this program checks whether or not a tape is an IM tape, the date on an IM tape, and whether or not there is a parity error on an IM tape. This program takes about 35 minutes to execute. Note, to check a single IM tape for something the IMC program should be used, not the CMB program.

RGN PROGRAM writes a RM tape from one month of IS tapes by reading, computing, reformating the results, and writing them onto the RM tape. This program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape. This program takes about 5 hours to execute.

TCY PROGRAM can make a copy of different kinds of tapes. This program can check what type of tape it is and whether or not there is a parity error on the tape read. The time required to execute this program is dependent on the number and length of records to be copied.

PM PROGRAM writes a CM tape from a RM tape. This program makes a number of checks on a RM tape whether or not it writes a CM tape and prints the results on the teletype screen: the number of missing data points for each component of each station for every day of the month. Also, this program checks whether or not a tape is a RM tape, the year and month on a RM tape, and whether or not there is a parity error on a RM tape. This program takes about 35 minutes to execute.

PS PROGRAM writes a FS tape from an IS tape. This program makes a number of checks on the IS tape whether or not it writes a CM tape and prints the results on the teletype screen: the number of missing data points for each component of every station for the whole day. Also, this program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape. This program takes about 45 minutes to execute.

II.B WA5 PROGRAM

The WA5 program is used for basic editing of archive tape data into one second data (IS tape) and/or one-minute data (IM tape). This program takes about 36 minutes to execute.

At the start of the program a header appears on the teletype screen as shown in figure 12. The header includes 5 instructions: mount the archive tape on any tape unit, mount the output tape on another tape unit, check that both tape units are on line and sense switches off, set the margin control to 2 and the copy switch to autoprint on the teletype terminal, and press the return when ready to proceed.

The first question will appear asking for the name of the person executing the program and the date of execution, which should be answered so that if a problem arises, who and when the program was executed will be known. The second question will ask whether or not to use previous data stored on disk. This question usually should be answered with a [Ø] whenever one wants to write an IS tape only, or an IS and IM tape as in figure 12. Previous data can be used when the last execution on the computer was to convert IS data to IM data and store it on disk. Thus, a [1] can be entered for this question to use IS data stored on disk to make an IM tape as in figure 13. Under these conditions the program takes much less than 36 minutes (probably 2 minutes) to execute since the program only has to write an IM tape compared to writing an IS tape (takes about 34 minutes) and an IM tape. The third question asks whether or not to write an IS tape. If one wants to write an IS tape, then a [1] should be entered for this question as in figure 12. The fourth question asks whether or not to write an IM tape, then a [1] should be entered for this question as in figures 12 & 13. The fifth question asks which is the input tape unit, that is, where the archive tape will be read (2 in the example of figure 12). Note (figure 13) that when one uses previous data stored on disk the third and fifth question do not appear. The sixth question asks which is the output tape unit, that is, where the IS and/or IM tape will be written ([1] in the examples of figures 12 & 13). The seventh question asks for the Julian date. For October 16, 1983, the 289th day of the year, the correct response would be 3289 as in figure 12. The eighth question asks whether or not to disable the time search. When a [Ø] is entered for this question as in figure 12 the program will read forward on the archive tape and position it 10 minutes before the day one wants to edit with WA5. If the tape has already been positioned at the day one wants to edit, for example after a WA5 execution is complete the archive tape is already positioned, then this question can be answered with a [1] to disable the time search as in figure 14. Also, if one learns from the Taplog that there are no data for the particular day one wants to edit, then the IS and/or IM tape can be filled with blank frames by answering this question with a [9] as in figure 15. Under these conditions the program will take much less than 36 minutes (probably 20 min-

```
WAS PROGRAM TO EDIT FLUXGATE DATA
   INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
   REVISION WAS.1    -    21 MAR 83    -    D.J.KNECHT
-------------------------------------------------------------
        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
ARMAND 26 SEP 84
   USE PREVIOUS DATA?     (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

   ONE-SECOND TAPE?       (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
   ONE-MINUTE TAPE?       (1=YES)   INTERIM FOR THE UDC-A TAPE
1
   INPUT TAPE UNIT:       (U)       1, 2, 3 FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
1
   JULIAN DATE:           (YDDD)    YEAR AND DAY
3289
   DISABLE TIME SEARCH?   (1=YES)   9=MISSING DAY (NO TAPE)

----------------------SETUP COMPLETE-------------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

----------------------TIME SEARCH LOG------------------------
DATA START TIME TO BE FOUND IS      289  0: 0: 0
              TAPE TIME IS NOW    3 288 21:17:30
              TAPE TIME IS NOW    3 288 22: 0: 0
              TAPE TIME IS NOW    3 288 23: 0: 0
END SEARCH: START DATA READING    3 288 23:50: 0
----------------------DATA EDITOR LOG------------------------
        PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

      START HOUR  0
        STN         1     0   168  168  9:  5: 0:53:40
      START HOUR  1
      START HOUR  2
      START HOUR  3
        STN         2     0  1334 1334  9: 38:12:53:40
        STN         3     0  1412 1412  9: 40:31:53:40
      START HOUR  4
      START HOUR  5
        END         1     3  1844 1844  3:289: 5: 7:20
      START HOUR  6
        STN         4     0  2422 2422  9: 68:23:53:40
      START HOUR  7
        STN         5     0  2611 2611  9: 72:30:53:40
      START HOUR  8
      START HOUR  9
      START HOUR 10
        STN         6     0  3864 3864  9:108:20:53:40
        STN         1    -8  3904 3904  0:  0: 0: 0: 0
        STN         1    -9  3904 3904  3:289:10:51: 0
      START HOUR 11
        STN         7     0  3985 3985  9:110:21:53:40
      START HOUR 12
      START HOUR 13
        STN         8     0  4742 4742  9:132: 3:53:40
```

Figure 12: Continued to the top of the 2nd column.

```
      START HOUR 14
        STN         9     0  5255 5255  9:146:33:53:40
      START HOUR 15
      START HOUR 16
        STN        10     0  5939 5939  9:166: 0:53:40
      START HOUR 17
      START HOUR 18
        STN        11     0  6512 6512  9:180:31:53:40
        STN        12     0  6774 6774  9:189: 8:53:40
      START HOUR 19
      START HOUR 20
        STN        13     0  7236 7236  9:200:30:53:40
      START HOUR 21
        STN        14     0  7633 7633  9:212:11:53:40
      START HOUR 22
        ZTL         1     1  8037 8037  0:  0: 0: 0: 0
        STN        15     0  8066 8066  9:224:22:53:40
      START HOUR 23
LABEL THIS TAPE  I53289
------------------ONE-SECOND TAPE COMPLETE-----------------
        MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
        OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
----------------------ONE-MINUTE TAPE----------------------
LABEL THIS TAPE  IM3289
------------------ONE-MINUTE TAPE COMPLETE-----------------
-------------------------END OF RUN-------------------------
JC##
```

Figure 12: Continued from the bottom of the 1st column.

```
WAS PROGRAM TO EDIT FLUXGATE DATA
   INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
   REVISION WAS.1    -    21 MAR 83    -    D.J.KNECHT
-------------------------------------------------------------
        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
RIC 25 AUG 84
   USE PREVIOUS DATA?     (1=YES)   ARCHIVE TAPE IS READ OTHERWISE
1
   ONE-MINUTE TAPE?       (1=YES)   INTERIM FOR THE UDC-A TAPE
1
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
1
----------------------SETUP COMPLETE-------------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

        MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
        OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
----------------------ONE-MINUTE TAPE----------------------
LABEL THIS TAPE  IM3356
------------------ONE-MINUTE TAPE COMPLETE-----------------
-------------------------END OF RUN-------------------------
```

Figure 13

```
                    WAS PROGRAM TO EDIT FLUXGATE DATA
          INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
          REVISION WAS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------------
        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

-----------------------OPTION SELECTION----------------------
 YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  SMITH 25 FEB 82
RIC 25 AUG 84
 USE PREVIOUS DATA?      (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

 ONE-SECOND TAPE?        (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
 ONE-MINUTE TAPE?        (1=YES)   INTERIM FOR THE UDC-A TAPE
1
 INPUT TAPE UNIT:        (U)       1, 8, 3 FOR UNIT #1, #2, #3
2
 OUTPUT TAPE UNIT:       (U)       1, 2, 3, BUT NOT THE INPUT
1
 JULIAN DATE:            (YDDD)    YEAR AND DAY
3334
 DISABLE TIME SEARCH?    (1=YES)   9=MISSING DAY (NO TAPE)
1
-----------------------SETUP COMPLETE------------------------
 PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

-----------------------DATA EDITOR LOG-----------------------
        PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

      START HOUR  0
        STN         1    -3   28   28  3:334: 0: 4:40
        STN         1    -9  298  298  3:334: 0:49:40
      START HOUR  1
        BND         1     5  387  387  3:334: 1: 4:30
      START HOUR  2
      START HOUR  3
        ZTL         1     1 1221 1221  0:  0: 0: 0: 0
        STN         1     0 1388 1388  4: 40:10:53:40
      START HOUR  4
        ZTL         2     2 1551 1551  0:  0: 0: 0: 0
      START HOUR  5
        STN         2     0 2129 2129  4: 60:25:53:40
      START HOUR  6
      START HOUR  7
      START HOUR  8
      START HOUR  9
        STN         3     0 3476 3476  4: 97:10:53:40
        STN         4     0 3526 3626  4: 98:42:53:40
      START HOUR 10
      START HOUR 11
        STN         1    -7 4059 4059  3:334:11:16:20
        STN         5     0 4064 4064  4:112:41:53:40
      START HOUR 12
        STN         6     0 4472 4472  4:124:30:53:40
      START HOUR 13
        STN         7     0 4714 4714  4:130:33:53:40
      START HOUR 14
        MOUNT NEXT ARCHIVE TAPE AND PRESS SIGN SWITCH
        OR TURN SS1 ON TO FILL OUT THE DAY WITH BLANKS
      START HOUR 15
      START HOUR 16
        ZTL         3     1 6829 6829  0:  0: 0: 0: 0
      START HOUR 17
      START HOUR 18
      START HOUR 19
      START HOUR 20
        BND         1     9 7361 7361  3:334:20:26:50
        ZTL         4     1 7501 7501  0:  0: 0: 0: 0
        STN         1    -5 7501 7501  3:334:20:50:20
      START HOUR 21
        ZTL         5     1 7653 7653  0:  0: 0: 0: 0
      START HOUR 22
      START HOUR 23
        STN         8     0 8358 8358  4:232:19:53:40
        STN         2    -5 8440 8440  3:334:23:26:40
        STN         2    -7 8454 8454  3:334:23:29:  0
        STN         1    -1 8459 8459  3:334:23:30:  0
        STN         2    -1 8558 8558  3:334:23:46:30
        STN         3    -5 8664 8664  3:334:23:47:20
LABEL THIS TAPE  1S3334
-------------------ONE-SECOND TAPE COMPLETE-------------------
        MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
        OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
-----------------------ONE-MINUTE TAPE-----------------------
LABEL THIS TAPE  1M3334
-------------------ONE-MINUTE TAPE COMPLETE-------------------
-------------------------END OF RUN--------------------------
```

Figure 14

```
                    UAS PROGRAM TO EDIT FLUXGATE DATA
          INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
          REVISION UAS.1     -     01 MAR 83      -      D.J.KNECHT
 ------------------------------------------------------------------

          1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
          2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
          3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
          4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          5. PRESS RETURN TO START THE RUN WHEN READY

     ----------------------OPTION SELECTION----------------------
     YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
RIC 01 JUL 84
     USE PREVIOUS DATA?     (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

     ONE-SECOND TAPE?       (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
     ONE-MINUTE TAPE?       (1=YES)   INTERIM FOR THE UDC-A TAPE
1
     INPUT TAPE UNIT:       (U)       1, 2, 3 FOR UNIT #1, #2, #3
2
     OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
3
     JULIAN DATE:           (YDDD)    YEAR AND DAY
3068
     DISABLE TIME SEARCH?   (1=YES)   0=MISSING DAY (NO TAPE)
0
     ------------------------SETUP COMPLETE----------------------
     PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

     ----------------------DATA EDITOR LOG-----------------------
           PROBLEM  COUNT  ISTM IOLD INEW    TIME LABEL

          START HOUR  0
          START HOUR  1
          START HOUR  2
          START HOUR  3
          START HOUR  4
          START HOUR  5
          START HOUR  6
          START HOUR  7
          START HOUR  8
          START HOUR  9
          START HOUR 10
          START HOUR 11
          START HOUR 12
          START HOUR 13
          START HOUR 14
          START HOUR 15
          START HOUR 16
          START HOUR 17
          START HOUR 18
          START HOUR 19
          START HOUR 20
          START HOUR 21
          START HOUR 22
          START HOUR 23
     LABEL THIS TAPE  163068
     --------------------ONE-SECOND TAPE COMPLETE------------------
           MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
           OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
     ------------------------ONE-MINUTE TAPE-----------------------
     LABEL THIS TAPE  183088
     --------------------ONE-MINUTE TAPE COMPLETE------------------

     ---------------------------END OF RUN---------------------------
```

Figure 15

utes) to execute since the program is writing blank frames on the IS tape, and if an IM tape is written then blank frames are written on it, too. Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed.

If the time search was not disabled then it will be executed, where the time to be found, the present time on the tape, and the time every hour on the hour is printed on the teletype screen as in figure 12. The program will stop searching when the tape is 10 minutes before the beginning of the day as in figure 12. If the time search was disabled, then this entire section will not be printed on the teletype screen as in figure 14.

As the program edits the data and writes an IS tape, it prints each hour of the day on the teletype screen as in figures 12 & 14. Also, with this printout of every hour a line is printed each time the program corrects an error in the data. These errors are listed and explained below, and some examples of them can be seen in figures 12 & 14.

ERROR MESSAGE		EXPLANATION
DAY	(BAD VALUE FOR DAY)	Day value of time label is greater than day sought at start of run or is different during the run.
STN	(BAD VALUE FOR STATION ID)	Station value is rejected by routine as wrong or unconfirmed.
ZTL	(ZERO TIME LOAD)	DDU has failed to load time properly after a DDU reset.
TIM	(ILLEGAL VALUE FOR TIME)	Illegal (impossible) time value.
SEQ	(TIME SEQUENCE ERROR)	Time value has jumped backward from last frame processed or stations for a given time are out of order.
GAP	(GAP IN THE DATA)	A GAP in the data is found for which there is no indication by an End Of File (EOF) mark or spacer frames.
ISN	(ISNUM ERROR)	Frame is received which was recorded as having been previously received.

(This list is continued on the next page)

BND (OUT OF BOUNDS)	Fluxgate value is more than 25ØØ nT different from the baseline value.
OFL (OVER FLOW)	Fluxgate value is within 25ØØ nT of baseline, but is exceeding ± 2Ø48 after baseline is subtracted, causing an overflow on the IS tape.

After 60 of the same error for a particular station occurs a question will appear asking whether or not to continue the execution as in figure 16. The usual response is a [Ø] to continue the execution and SS3 must be turned on or otherwise the program will ask the same question again whenever the same error for the same station occurs. To prevent the occurrence of this question completely one can press SS3 on at the beginning of the program. For example in figure 17 more than 60 errors occurred without the appearance of this question because SS3 was pressed on at the beginning of the execution. If the same error for the same station continues they will appear on the teletype screen until 500 of them are encountered; after that number to save paper no more will appear on the teletype screen even though they exist.

During the execution of the WA5 program sometimes a command will appear when the archive tape being read reaches its end and begins to rewind. To continue the process of editing the data for the rest of the day the next archive tape has to be mounted and the sign switch pressed as shown in figures 14 & 18. Also, the command has an option of pressing SS1 on to fill out the day with blank frames. This option would be done when there is no more data for that day.

A question which may appear during an execution is one which asks for the method of GAP TREATMENT as in figure 18. The question of GAP TREATMENT only appears if the program does not understand the possible gap that it has encountered. When the program encounters a gap and understands it, it fills the gap with blank frames and continues editing without asking the question. Whenever this question appears one should check the Taplog for a gap. The Taplog sometimes shows whether or not a gap exists. The following procedure is the best possible solution whenever this question occurs. If one checks the Taplog and notices that there are some records out of order or over-written, then the question should be answered with a [Ø]. If the question reappears then continue to answer it with a [Ø] until the gap question asked corresponds to a real gap. For example if there were over-written records then the records which were written over are lost and thus, there is a gap. One must check the time corresponding to each gap question; and when the question which shows the time of a real gap appears, then it should be answered with a [1] as in figure 19. Often the Taplog indicates that there are some missing data, then this question should be answered with a [1]. Sometimes when this question appears and one looks at the Taplog no gap is evident, one should answer the question with a [1] because the Taplog program does not

```
      UNIX PROGRAM TO EDIT FLIGHT DATA
        INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
        REVISION UNS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------

        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
RIC 15 AUG 84
   USE PREVIOUS DATA?     (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

   ONE-SECOND TAPE?       (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
   ONE-MINUTE TAPE?       (1=YES)   INTERIM FOR THE UDC-A TAPE
1
   INPUT TAPE UNIT:       (U)       1, 2, 3 FOR UNIT M1, M2, M3
3
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
2
   JULIAN DATE:           (YDDD)    YEAR AND DAY
3261
   DISABLE TIME SEARCH?   (1=YES)   0=MISSING DAY (NO TAPE)
1
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------DATA EDITOR LOG----------------------
        PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

      START HOUR  0
        BND         1     5   288  288  3:261: 0:48: 0
        BND         2     5   289  289  3:261: 0:48:10
        BND         3     5   290  290  3:261: 0:48:20
        BND         4     5   291  291  3:261: 0:48:30
        BND         5     5   292  292  3:261: 0:48:40
        BND         6     5   293  293  3:261: 0:48:50
        BND         7     5   294  294  3:261: 0:49: 0
        BND         8     5   295  295  3:261: 0:49:10
        BND         9     5   296  296  3:261: 0:49:20
        BND        10     5   297  297  3:261: 0:49:30
        BND        11     5   298  298  3:261: 0:49:40
        BND        12     5   299  299  3:261: 0:49:50
        BND        13     5   300  300  3:261: 0:50: 0
        BND        14     5   301  301  3:261: 0:50:10
        BND        15     5   302  302  3:261: 0:50:20
        BND        16     5   303  303  3:261: 0:50:30
        BND        17     5   304  304  3:261: 0:50:40
        BND        18     5   305  305  3:261: 0:50:50
        BND        19     5   306  306  3:261: 0:51: 0
        BND        20     5   307  307  3:261: 0:51:10
        BND        21     5   308  308  3:261: 0:51:20
        BND        22     5   310  310  3:261: 0:51:40
        BND        23     5   311  311  3:261: 0:51:50
        BND        24     6   312  312  3:261: 0:52: 0
        BND        25     5   313  313  3:261: 0:62:10
        BND        26     5   314  314  3:261: 0:52:20
        BND        27     5   315  315  3:261: 0:52:30
        BND        28     5   316  316  3:261: 0:52:40
        BND        29     5   317  317  3:261: 0:52:50
        BND        30     6   318  318  3:261: 0:63: 0
        STN         1     0   320  320  1: 10:20:53:40
        BND        31     5   347  347  3:261: 0:57:50
        BND        32     6   348  348  3:261: 0:58: 0
        BND        33     5   349  349  3:261: 0:58:10
        BND        34     5   350  350  3:261: 0:58:20
        BND        35     5   351  351  3:261: 0:58:30
        BND        36     5   352  352  3:261: 0:58:40
        BND        37     5   353  353  3:261: 0:58:50
        BND        38     5   354  354  3:261: 0:59: 0
        BND        39     5   356  356  3:261: 0:59:20
        BND        40     5   357  357  3:261: 0:59:30
        BND        41     5   358  358  3:261: 0:59:40
        BND        42     5   359  359  3:261: 0:59:50
        BND        43     5   360  360  3:261: 1: 0: 0
        BND        44     5   362  362  3:261: 1: 0:20
        BND        45     5   363  363  3:261: 1: 0:30
        BND        46     5   364  364  3:261: 1: 0:40
        BND        47     5   365  365  3:261: 1: 0:50
        BND        48     5   366  366  3:261: 1: 1: 0
      START HOUR  1
        BND        49     5   367  367  3:261: 1: 1:10
        BND        50     5   368  368  3:261: 1: 1:20
        BND        51     5   369  369  3:261: 1: 1:30
        BND        52     5   370  370  3:261: 1: 1:40
        BND        53     5   371  371  3:261: 1: 1:50
        BND        54     5   372  372  3:261: 1: 2: 0
        BND        55     5   373  373  3:261: 1: 2:10
        BND        56     5   374  374  3:261: 1: 2:20
        BND        57     5   375  375  3:261: 1: 2:30
        BND        58     5   376  376  3:261: 1: 2:40
        BND        59     5   378  378  3:261: 1: 3: 0
        BND        60     5   379  379  3:261: 1: 3:10
        BND        61     5   380  380  3:261: 1: 3:20
  CONTINUE THE RUN?  (0=CONTINUE 1=TERMINATE)
        BND        62     5   381  381  3:261: 1: 3:30
        BND        63     5   382  382  3:261: 1: 3:40
        BND        64     5   383  383  3:261: 1: 3:50
        BND        65     5   384  384  3:261: 1: 4: 0
        BND        66     5   385  385  3:261: 1: 4:10
        BND        67     5   386  386  3:261: 1: 4:20
        BND        68     5   387  387  3:261: 1: 4:30
        BND        69     5   388  388  3:261: 1: 4:40
        BND        70     5   389  389  3:261: 1: 4:50
        BND        71     5   390  390  3:261: 1: 5: 0
        BND        72     5   391  391  3:261: 1: 5:10
        BND        73     5   392  392  3:261: 1: 5:20
        BND        74     5   393  393  3:261: 1: 5:30
        BND        75     5   394  394  3:261: 1: 5:40
        BND        76     5   395  395  3:261: 1: 5:50
        BND        77     5   396  396  3:261: 1: 6: 0
        BND        78     5   405  405  3:261: 1: 7:30
        BND        79     5   406  406  3:261: 1: 7:40
        BND        80     5   407  407  3:261: 1: 7:50
        BND        81     5   409  409  3:261: 1: 8:10
        BND        82     5   410  410  3:261: 1: 8:20
        BND        83     5   411  411  3:261: 1: 8:30
        BND        84     5   412  412  3:261: 1: 8:40
        BND        85     6   413  413  3:261: 1: 8:50
        BND        86     6   414  414  3:261: 1: 9: 0
        BND        87     5   415  415  3:261: 1: 9:10
        BND        88     5   416  416  3:261: 1: 9:20
        BND        89     6   417  417  3:261: 1: 9:30
        BND        90     6   419  419  3:261: 1: 9:50
```

Figure 16

```
WHS PROGRAM TO EDIT FLIGHTE DATA
   INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
   REVISION WHS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------

      1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
      2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
      3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
      4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
      5. PRESS RETURN TO START THE RUN WHEN READY

----------------------OPTION SELECTION-----------------------
  YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
WHS 31 JULY 84
  USE PREVIOUS DATA?      (1=YES)   ARCHIVE TAPE IS READ OTHERWISE
1
  ONE-SECOND TAPE?        (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
  ONE-MINUTE TAPE?        (1=YES)   INTERIM FOR THE UDC-A TAPE
1
  INPUT TAPE UNIT:        (U)       1, 2, 3 FOR UNIT #1, #2, #3
1
  OUTPUT TAPE UNIT:       (U)       1, 2, 3, BUT NOT THE INPUT
2
  JULIAN DATE:            (YDDD)    YEAR AND DAY
3239
  DISABLE TIME SEARCH?    (1=YES)   9=MISSING DAY (NO TAPE)
1
-----------------------SETUP COMPLETE------------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

----------------------DATA EDITOR LOG-----------------------
        PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

      START HOUR  0
      START HOUR  1
      START HOUR  2
        BND           1     9   932  932  3:239: 2:35:20
      START HOUR  3
      START HOUR  4
        STN           1     0  1536 1536  9: 42:30:53:40
        STN           2     0  1735 1735  9: 49: 9:53:40
        STN           3     0  1804 1804  9: 50: 5:53:40
      START HOUR  5
        ZTL           1     1  1852 1852  0:  0: 0: 0: 0
      START HOUR  6
        STN           4     0  2239 2239  9: 62:19:53:40
        STN           1    -2  2410 2410  3:239: 6:41:50
        STN           2    -2  2411 2411  3:239: 6:42: 0
        STN           3    -2  2412 2412  3:239: 6:42:10
        STN           4    -2  2413 2413  3:239: 6:42:20
        STN           5    -2  2414 2414  3:239: 6:42:30
      START HOUR  7
      START HOUR  8
      START HOUR  9
      START HOUR 10
      START HOUR 11
      START HOUR 12
        BND           1     8  4430 4430  3:239:12:18:20
        STN           5     0  4663 4663  9:130:39:53:40
      START HOUR 13
        BND           1     5  4692 4692  3:239:13: 2: 0
        BND           2     5  4693 4693  3:239:13: 2:10
        BND           3     5  4695 4695  3:239:13: 2:30
        BND           4     5  4697 4697  3:239:13: 2:50
        BND           5     5  4699 4699  3:239:13: 3:10
        BND           6     6  4702 4702  3:239:13: 3:40
        BND           7     5  4703 4703  3:239:13: 3:50
        BND           8     5  4704 4704  3:239:13: 4: 0
        BND           9     5  4706 4706  3:239:13: 4:20
        BND          10     5  4708 4708  3:239:13: 4:40
        BND          11     5  4709 4709  3:239:13: 4:50
        BND          12     5  4710 4710  3:239:13: 5: 0
        BND          13     5  4711 4711  3:239:13: 5:10
        BND          14     5  4714 4714  3:239:13: 5:40
        BND          15     5  4716 4716  3:239:13: 6: 0
        BND          16     5  4717 4717  3:239:13: 6:10
        BND          17     5  4718 4718  3:239:13: 6:20
        BND          18     5  4719 4719  3:239:13: 6:30
        BND          19     5  4721 4721  3:239:13: 6:50
        BND          20     5  4722 4722  3:239:13: 7: 0
        BND          21     5  4723 4723  3:239:13: 7:10
        BND          22     5  4724 4724  3:239:13: 7:20
        BND          23     5  4725 4725  3:239:13: 7:30
        BND          24     5  4726 4726  3:239:13: 7:40
        BND          25     5  4727 4727  3:239:13: 7:50
        BND          26     5  4729 4729  3:239:13: 8:10
        BND          27     5  4730 4730  3:239:13: 8:20
        BND          28     5  4731 4731  3:239:13: 8:30
        BND          29     5  4733 4733  3:239:13: 8:50
        BND          30     5  4734 4734  3:239:13: 9: 0
        BND          31     5  4735 4735  3:239:13: 9:10
        BND          32     5  4736 4736  3:239:13: 9:20
        BND          33     5  4737 4737  3:239:13: 9:30
        BND          34     5  4738 4738  3:239:13: 9:40
        BND          35     5  4739 4739  3:239:13: 9:50
        BND          36     5  4740 4740  3:239:13:10: 0
        BND          37     5  4741 4741  3:239:13:10:10
        BND          38     5  4742 4742  3:239:13:10:20
        BND          39     5  4743 4743  3:239:13:10:30
        BND          40     5  4744 4744  3:239:13:10:40
        BND          41     5  4745 4745  3:239:13:10:50
        BND          42     5  4746 4746  3:239:13:11: 0
        BND          43     5  4747 4747  3:239:13:11:10
        BND          44     5  4748 4748  3:239:13:11:20
        BND          45     5  4750 4750  3:239:13:11:40
        BND          46     5  4751 4751  3:239:13:11:50
        BND          47     5  4752 4752  3:239:13:12: 0
        BND          48     5  4753 4753  3:239:13:12:10
        BND          49     5  4755 4755  3:239:13:12:30
        BND          50     5  4756 4756  3:239:13:12:40
        BND          51     5  4758 4758  3:239:13:13: 0
        BND          52     5  4759 4759  3:239:13:13:10
        BND          53     5  4760 4760  3:239:13:13:20
        BND          54     5  4762 4762  3:239:13:13:40
        BND          55     5  4763 4763  3:239:13:13:50
        BND          56     5  4764 4764  3:239:13:14: 0
        BND          57     5  4765 4765  3:239:13:14:10
        BND          58     5  4766 4766  3:239:13:14:20
        BND          59     5  4767 4767  3:239:13:14:30
        BND          60     5  4768 4768  3:239:13:14:40
        BND          61     5  4769 4769  3:239:13:14:50
        BND          62     5  4770 4770  3:239:13:15: 0
        BND          63     5  4771 4771  3:239:13:15:10
        BND          64     5  4773 4773  3:239:13:15:30
        BND          65     5  4774 4774  3:239:13:15:40
        BND          66     6  4775 4775  3:239:13:15:50
        BND          67     5  4776 4776  3:239:13:16: 0
        BND          68     6  4777 4777  3:239:13:16:10
```

Figure 17

```
                    WAS PROGRAM TO EDIT FLUXGATE DATA
          INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
          REVISION WAS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------------

        1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
        2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN WHEN READY

----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  SMITH 25 FEB 82
RIC 24 AUG 84
   USE PREVIOUS DATA?      (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

   ONE-SECOND TAPE?        (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
   ONE-MINUTE TAPE?        (1=YES)   INTERIM FOR THE UDC-A TAPE
1
   INPUT TAPE UNIT:        (U)       1, 2, 3 FOR UNIT #1, #2, #3
2
   OUTPUT TAPE UNIT:       (U)       1, 2, 3, BUT NOT THE INPUT
1
   JULIAN DATE:            (YDDD)    YEAR AND DAY
3327
   DISABLE TIME SEARCH?    (1=YES)   9=MISSING DAY (NO TAPE)
1
------------------------SETUP COMPLETE-------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

----------------------DATA EDITOR LOG------------------------
        PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

      START HOUR  0
      START HOUR  1
      START HOUR  2
        STN         1    -9   944  944  3:327: 2:37:20
        STN         1     0  1018 1018  7: 29:12:53:40
      START HOUR  3
        ZTL         1     1  1301 1301  0:  0: 0: 0: 0
      START HOUR  4
      START HOUR  5
        MOUNT NEXT ARCHIVE TAPE AND PRESS SIGN SWITCH
        OR TURN SS1 ON TO FILL OUT THE DAY WITH BLANKS
      START HOUR  6
        STN         2     0  2259 2259  7: 62:33:53:40
      START HOUR  7
      START HOUR  8
        STN         3     0  3024 3024  7: 84:20:53:40
        ZTL         2     1  3081 3081  0:  0: 0: 0: 0
        STN         4     0  3136 3136  7: 88:14:53:40
      START HOUR  9
      START HOUR 10
      START HOUR 11
        STN         1    -7  4042 4042  3:327:11:13:40
        GAP         1     5  4137 4195  3:327:11:39:10
   GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)
1
        STN         5     0  4217 4217  7:118:15:53:40
      START HOUR 12
      START HOUR 13
      START HOUR 14
        STN         1    -2  5185 5185  3:327:14:24:10
      START HOUR 15
        STN         6     0  5765 5765  7:160: 8:53:40
      START HOUR 16
      START HOUR 17
      START HOUR 18
        STN         7     0  6665 6665  7:186: 5:53:40
      START HOUR 19
        STN         8     0  7150 7150  7:200:12:53:40
      START HOUR 20
        STN         9     0  7434 7434  7:207: 9:53:40
      START HOUR 21
        STN         2    -2  7851 7851  3:327:21:48:30
        STN         2    -9  7852 7852  3:327:21:48:40
        STN         1    -1  7853 7853  3:327:21:49: 0
      START HOUR 22
        STN         1    -5  8087 8087  3:327:22:27:50
        ZTL         3     1  8234 8234  0:  0: 0: 0: 0
      START HOUR 23
LABEL THIS TAPE  1S3327
------------------ONE-SECOND TAPE COMPLETE------------------
        MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
        OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
-----------------------ONE-MINUTE TAPE-----------------------
LABEL THIS TAPE  1M3327
------------------ONE-MINUTE TAPE COMPLETE------------------
-------------------------END OF RUN-------------------------
```

Figure 18

```
                    WAS PROGRAM TO EDIT FLUXGATE DATA
        INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
        REVISION WAS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------------
          1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
          2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
          3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
          4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          5. PRESS RETURN TO START THE RUN WHEN READY

-----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 25 FEB 82
RIC 22 AUG 84
   USE PREVIOUS DATA?     (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

   ONE-SECOND TAPE?       (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
   ONE-MINUTE TAPE?       (1=YES)   INTERIM FOR THE WDC-A TAPE
1
   INPUT TAPE UNIT:       (U)       1, 2, 3 FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
1
   JULIAN DATE:           (YDDD)    YEAR AND DAY
3305
   DISABLE TIME SEARCH?   (1=YES)   9=MISSING DAY (NO TAPE)

-----------------------SETUP COMPLETE------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

-----------------------TIME SEARCH LOG-----------------------
   DATA START TIME TO BE FOUND IS      3305  0: 0: 0
                  TAPE TIME IS NOW     3 304 11:19:50
                  TAPE TIME IS NOW     3 304 12: 0:20
                  TAPE TIME IS NOW     3 304 13: 0:30
                  TAPE TIME IS NOW     3 304 14: 0:20
                  TAPE TIME IS NOW     3 304 15: 0:10
                  TAPE TIME IS NOW     3 304 16: 0: 0
                  TAPE TIME IS NOW     3 304 17: 0:30
                  TAPE TIME IS NOW     3 304 18: 0: 0
                  TAPE TIME IS NOW     3 304 19: 0:30
                  TAPE TIME IS NOW     3 304 20: 0:10
                  TAPE TIME IS NOW     3 304 21: 0: 0
                  TAPE TIME IS NOW     3 304 22: 0: 0
                  TAPE TIME IS NOW     3 304 23: 0: 0
   END SEARCH: START DATA READING      3 304 23:50:10
-----------------------DATA EDITOR LOG-----------------------
         PROBLEM  COUNT  ISTN IOLD INEW     TIME LABEL

       START HOUR  0
       START HOUR  1
       START HOUR  2
       START HOUR  3
         STN         1     0  1183 1183  5: 32:39:53:40
         STN         2     0  1258 1258  5: 35:12:53:40
         ZTL         1     1  1426 1426  0:  0: 0: 0: 0
         STN         1    -9  1426 1426  3:305: 3:57:50
       START HOUR  4
         ZTL         2     1  1787 1787  0:  0: 0: 0: 0
       START HOUR  5
       START HOUR  6
       START HOUR  7
       START HOUR  8
       START HOUR  9

       START HOUR 10
          MOUNT NEXT ARCHIVE TAPE AND PRESS SIGN SWITCH
          OR TURN SS1 ON TO FILL OUT THE DAY WITH BLANKS
                GAP         1     9  3872 7378  3:305:20:29:40
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         2     1  3872 7379  3:305:20:29:50
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         3     2  3872 7379  3:305:20:29:50
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         4     3  3872 7379  3:305:20:29:50
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         5     7  3872 7379  3:305:20:29:50
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         6     9  3872 7379  3:305:20:29:50
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         7     1  3872 7380  3:305:20:30: 0
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         8     2  3872 7380  3:305:20:30: 0
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP         9     3  3872 7380  3:305:20:30: 0
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        10     7  3872 7380  3:305:20:30: 0
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        11     9  3872 7380  3:305:20:30: 0
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        12     1  3872 7381  3:305:20:30:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        13     2  3872 7381  3:305:20:30:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        14     3  3872 7381  3:305:20:30:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        15     7  3872 7381  3:305:20:30:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        16     9  3872 7381  3:305:20:30:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        17     1  3872 7382  3:305:20:30:20
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        18     2  3872 7382  3:305:20:30:20
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        19     3  3872 7382  3:305:20:30:20
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

                GAP        20     7  3872 7382  3:305:20:30:20
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)
```

Figure 19: First of three pages.

```
        GAP        21     9  3872 7382  3:30S:20:30:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        ZTL         3     1  3872 3872  0:  0:  0:  0:  0
        GAP        22     1  3872 7385  3:30S:20:30:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        23     2  3872 7385  3:30S:20:30:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        24     3  3872 7385  3:30S:20:30:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        25     9  3872 7385  3:30S:20:30:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        26     1  3872 7386  3:30S:20:31:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        27     2  3872 7386  3:30S:20:31:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        28     3  3872 7386  3:30S:20:31:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        29     7  3872 7386  3:30S:20:31:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        30     9  3872 7386  3:30S:20:31:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        31     1  3872 7387  3:30S:20:31:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        32     2  3872 7387  3:30S:20:31:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        33     3  3872 7387  3:30S:20:31:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        34     7  3872 7387  3:30S:20:31:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        35     9  3872 7387  3:30S:20:31:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        36     1  3872 7388  3:30S:20:31:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        37     2  3872 7388  3:30S:20:31:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        38     3  3872 7388  3:30S:20:31:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        39     7  3872 7388  3:30S:20:31:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        40     9  3872 7388  3:30S:20:31:20
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        41     1  3872 7389  3:30S:20:31:30
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        42     2  3872 7389  3:30S:20:31:30
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        43     3  3872 7389  3:30S:20:31:30
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        44     7  3872 7389  3:30S:20:31:30
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        45     9  3872 7389  3:30S:20:31:30
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        46     1  3872 7390  3:30S:20:31:40
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        47     2  3872 7390  3:30S:20:31:40
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        48     3  3872 7390  3:30S:20:31:40
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        49     7  3872 7390  3:30S:20:31:40
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        50     9  3872 7390  3:30S:20:31:40
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        51     1  3872 7391  3:30S:20:31:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        52     2  3872 7391  3:30S:20:31:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        53     3  3872 7391  3:30S:20:31:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        54     7  3872 7391  3:30S:20:31:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        55     9  3872 7391  3:30S:20:31:50
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        56     1  3872 7392  3:30S:20:32:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        57     2  3872 7392  3:30S:20:32:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        58     3  3872 7392  3:30S:20:32:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        59     7  3872 7392  3:30S:20:32:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        60     9  3872 7392  3:30S:20:32:  0
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        61     1  3872 7393  3:30S:20:32:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        62     2  3872 7393  3:30S:20:32:10
GAP TREATMENT:  (0-RETRY 1-FILL 2-FILL ALL)

        GAP        63     3  3872 7393  3:30S:20:32:10
```

Figure 19: Second of three pages.

```
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

        GAP          64      7  3872 7393  3:30S:20:32:10
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

        GAP          65      9  3872 4065  3:30S:11:17:30
GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)

      START HOUR 11
      START HOUR 12
        ZTL           4      1  4348 4348  0:  0: 0: 0: 0
        STM           3      0  4351 4351  5:12:30:53:40
      START HOUR 13
      START HOUR 14
      START HOUR 15
      START HOUR 16
        STM           4      0  6044 6044  5:16:41:53:40
      START HOUR 17
        STM           1     -7  6178 6178  3:30S:17: 9:40
        STM           2     -7  6179 6179  3:30S:17: 9:50
        STM           3     -7  6180 6180  3:30S:17:10: 0
        STM           4     -7  6181 6181  3:30S:17:10:10
        STM           5     -7  6182 6182  3:30S:17:10:20
      START HOUR 18
        ZTL           5      1  6572 6572  0:  0: 0: 0: 0
      START HOUR 19
        STM           5      0  7012 7012  6:19S: 4:53:40
      START HOUR 20
      START HOUR 21
      START HOUR 22
      START HOUR 23
        STM           6      0  8433 8433  6:23:31:53:40
LABEL THIS TAPE  IS330S
------------------ONE-SECOND TAPE COMPLETE-------------------
       MOUNT A BLANK TAPE AND PRESS SIGN SWITCH
       OR TURN SS2 ON TO OMIT THE ONE-MINUTE TAPE
-----------------------ONE-MINUTE TAPE-----------------------
LABEL THIS TAPE  IM330S
------------------ONE-MINUTE TAPE COMPLETE-------------------
--------------------------END OF RUN--------------------------
```

Figure 19: Third of three pages.

always show a gap when it exists. Finally, if one discovers that there are many gaps and anticipates the question being asked many times, then a [2] may be entered for this question. Now whenever a gap is encountered it will automatically be filled with blank frames without asking the question. A word of advice to the operator, avoid using the [2] option for this question, because data which actually exist may be filled with blank frames which when occur WA5 will print many ISN error messages. To elaborate when there are out of order or overwritten records and the GAP QUESTION is answered by filling it with blank frames, then when this spot on the tape is passed and the program finds the actual data it will print ISN errors, because it has already encountered these times when it filled this particular period with blank frames as shown in figure 20.

When the program finishes writing an IS tape it will state so and state to label the IS tape appropriately. Then a statement will appear instructing one to mount a blank tape and press the sign switch to write an IM tape, or press SS2 on to omit the IM tape and end the execution. When an IM tape is written the computer will state so and state to label the IM tape appropriately. Finally, the program will state that it has completed the execution and automatically copies the output which is usually 1 page.

```
                    UAS PROGRAM TO EDIT FLUXGATE DATA
        INTERIM 1-SEC TAPE, INTERIM 1-MIN TAPE, WITH NO PLOTS
        REVISION UAS.1     -     21 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------------

          1. MOUNT THE ARCHIVE TAPE ON ANY TAPE UNIT
          2. MOUNT A BLANK TAPE ON ANOTHER TAPE UNIT
          3. CHECK SENSE SWITCHES OFF, TAPES ON LINE
          4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          5. PRESS RETURN TO START THE RUN WHEN READY

-----------------------OPTION SELECTION----------------------
   YOUR CALLSIGN AND DATE OF RUN   (EXAMPLE: SMITH 25 FEB 82
AAA 1  AUG 84
   USE PREVIOUS DATA?          (1=YES)   ARCHIVE TAPE IS READ OTHERWISE

   ONE-SECOND TAPE?            (1=YES)   INTERIM FOR THE AFGL CDC TAPE
1
   ONE-MINUTE TAPE?            (1=YES)   INTERIM FOR THE UDC-A TAPE
1
   INPUT TAPE UNIT:            (U)       1, 2, 3 FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:           (U)       1, 2, 3, BUT NOT THE INPUT
3
   JULIAN DATE:                (YDDD)    YEAR AND DAY
3272
   DISABLE TIME SEARCH?        (1=YES)   9=MISSING DAY (NO TAPE)
1
-----------------------SETUP COMPLETE------------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

-----------------------DATA EDITOR LOG-----------------------
          PROBLEM  COUNT  ISTN IOLD INEW    TIME LABEL

        START HOUR  0
          STN          1     0   186  186  21  61 8:53:40
        START HOUR  1
          STN          2     0   602  602  21 181 2:53:40
          STN          3     0   677  677  21 201:5:53:40
        START HOUR  2
        START HOUR  3
        START HOUR  4
          MOUNT NEXT ARCHIVE TAPE AND PRESS SIGN SWITCH
          OR TURN SS1 ON TO FILL OUT THE DAY WITH BLANKS
          GAP          1     1  1778 5146  3:272:14:17:40
   GAP TREATMENT:  (0=RETRY 1=FILL 2=FILL ALL)
1
        START HOUR  5
        START HOUR  6
        START HOUR  7
        START HOUR  8
        START HOUR  9
        START HOUR 10
        START HOUR 11
        START HOUR 12
        START HOUR 13
        START HOUR 14
          DAY          1     3  5160 8274  9:139:22:59: 0
          ISN          1     7  5160 1798  3:272: 4:59:40
          ISN          2     8  5160 1798  3:272: 4:59:40
          ISN          3     9  5160 1798  3:272: 4:59:40
          ISN          4     1  5160 1799  3:272: 4:59:50
          ISN          5     2  5160 1799  3:272: 4:59:50
          ISN          6     3  5160 1799  3:272: 4:59:50
          ISN          7     7  5160 1799  3:272: 4:59:50
```

```
ISN          8     8  5160 1799  3:272: 4:59:50
ISN          9     9  5160 1799  3:272: 4:59:50
ISN         10     1  5160 1800  3:272: 5: 0: 0
ISN         11     2  5160 1800  3:272: 5: 0: 0
ISN         12     3  5160 1800  3:272: 5: 0: 0
ISN         13     7  5160 1800  3:272: 5: 0: 0
ISN         14     8  5160 1800  3:272: 5: 0: 0
ISN         15     9  5160 1800  3:272: 5: 0: 0
ISN         16     1  5160 1801  3:272: 5: 0:10
ISN         17     2  5160 1801  3:272: 5: 0:10
ISN         18     3  5160 1801  3:272: 5: 0:10
ISN         19     7  5160 1801  3:272: 5: 0:10
ISN         20     8  5160 1801  3:272: 5: 0:10
ISN         21     9  5160 1801  3:272: 5: 0:10
ISN         22     1  5160 1802  3:272: 5: 0:20
ISN         23     2  5160 1802  3:272: 5: 0:20
ISN         24     3  5160 1802  3:272: 5: 0:20
ISN         25     7  5160 1802  3:272: 5: 0:20
ISN         26     8  5160 1802  3:272: 5: 0:20
ISN         27     9  5160 1802  3:272: 5: 0:20
ISN         28     1  5160 1803  3:272: 5: 0:30
ISN         29     2  5160 1803  3:272: 5: 0:30
ISN         30     3  5160 1803  3:272: 5: 0:30
ISN         31     7  5160 1803  3:272: 5: 0:30
ISN         32     8  5160 1803  3:272: 5: 0:30
ISN         33     9  5160 1803  3:272: 5: 0:30
ISN         34     1  5160 1804  3:272: 5: 0:40
ISN         35     2  5160 1804  3:272: 5: 0:40
ISN         36     3  5160 1804  3:272: 5: 0:40
ISN         37     7  5160 1804  3:272: 5: 0:40
ISN         38     8  5160 1804  3:272: 5: 0:40
ISN         39     9  5160 1804  3:272: 5: 0:40
ISN         40     1  5160 1805  3:272: 5: 0:50
ISN         41     2  5160 1805  3:272: 5: 0:50
ISN         42     3  5160 1805  3:272: 5: 0:50
ISN         43     7  5160 1805  3:272: 5: 0:50
ISN         44     8  5160 1805  3:272: 5: 0:50
ISN         45     9  5160 1805  3:272: 5: 0:50
ISN         46     1  5160 1806  3:272: 5: 1: 0
ISN         47     2  5160 1806  3:272: 5: 1: 0
ISN         48     3  5160 1806  3:272: 5: 1: 0
ISN         49     7  5160 1806  3:272: 5: 1: 0
ISN         50     8  5160 1806  3:272: 5: 1: 0
ISN         51     9  5160 1806  3:272: 5: 1: 0
ISN         52     1  5160 1807  3:272: 5: 1:10
ISN         53     2  5160 1807  3:272: 5: 1:10
ISN         54     7  5160 1807  3:272: 5: 1:10
ISN         55     8  5160 1807  3:272: 5: 1:10
ISN         56     1  5160 1808  3:272: 5: 1:20
ISN         57     2  5160 1808  3:272: 5: 1:20
ISN         58     3  5160 1808  3:272: 5: 1:20
ISN         59     7  5160 1808  3:272: 5: 1:20
ISN         60     8  5160 1808  3:272: 5: 1:20
ISN         61     9  5160 1808  3:272: 5: 1:20
ISN         62     1  5160 1809  3:272: 5: 1:30
ISN         63     2  5160 1809  3:272: 5: 1:30
ISN         64     3  5160 1809  3:272: 5: 1:30
ISN         65     7  5160 1809  3:272: 5: 1:30
ISN         66     8  5160 1809  3:272: 5: 1:30
ISN         67     9  5160 1809  3:272: 5: 1:30
ISN         68     1  5160 1810  3:272: 5: 1:40
ISN         69     2  5160 1810  3:272: 5: 1:40
ISN         70     3  5160 1810  3:272: 5: 1:40
ISN         71     7  5160 1810  3:272: 5: 1:40
```

Figure 20

II.C CV2 PROGRAM

The CV2 program creates the data needed for an IM tape by reading and computing from an IS tape. It is used when an IM tape has to be remade because the original either had an error and/or had not been retained. The CV2 program program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape. This program takes about 10 minutes to execute.

At the start of the program a header appears on the screen as shown in figure 21. The header includes 2 instructions: mount the IS tape on any tape unit and press the return when ready to proceed.

The first question asks for the IS tape number. For February 9, 1979, the 40th day of the year, the correct response would be 9Ø4Ø as shown in figure 21. The second question asks which is the input tape unit, that is, where the IS tape will be read ([3] in the example of figure 21). Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed. As the program is executing the IS tape is read and the data created is stored on disk. When the program is complete it will appear as in figure 21, where the last statement instructs one to request the WA5 program and select the previous data option. Finally, the WA5 program takes about 2 minutes to write the IM tape from the disk.

If a tape is not an IS tape, then when it is read the program aborts itself as in figure 22. The date entered for the IS tape number question in the example of figure 21 was the actual date on the IS tape, thus the program was able to read the tape correctly and give a positive response. For example if for some reason one was not sure whether or not the tape was labeled with the correct date, then the CV2 program could be used to check this problem. In figure 23 an incorrect date was entered for the IS tape number question, and the program states that there is a DATE PROBLEM and had to be aborted manually, otherwise the program will continue until it reaches the end of the IS tape and then aborts itself. Finally, if a parity error exists on the IS tape, then the program states that there is a TAPE READ ERROR - IST= -3 and aborts itself as in figure 24.

```
CU2 PROGRAM - MAKES IM FROM IS TAPES
    REVISION CU2.1          22 MAR 83          D.J.KNECHT
-------------------------------------------------------------
      1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
      2. PRESS RETURN TO START THE RUN, WHEN READY
---------------------- OPTION SELECTION ---------------------
  IS TAPE NUMBER: (YDDD)
9040
  INPUT TAPE UNIT (1,2,3)!
3
----------------------- SETUP COMPLETE ----------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

---------------------- READING COMPLETE ---------------------
 NEXT CALL THE WAS PROGRAM AND REQUEST THE PREVIOUS-DATA OPTION
JC!!
```

Figure 21

```
CU2 PROGRAM - MAKES IM FROM IS TAPES
    REVISION CU2.1          22 MAR 83          D.J.KNECHT
-------------------------------------------------------------
      1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
      2. PRESS RETURN TO START THE RUN, WHEN READY
---------------------- OPTION SELECTION ---------------------
  IS TAPE NUMBER: (YDDD)
9040
  INPUT TAPE UNIT (1,2,3)!
3
----------------------- SETUP COMPLETE ----------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

 ABORT: IRF( 0)=  5759
JC!!
```

Figure 22


```
CU2 PROGRAM - MAKES IM FROM IS TAPES
    REVISION CU2.1          22 MAR 83          D.J.KNECHT
-------------------------------------------------------------
      1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
      2. PRESS RETURN TO START THE RUN, WHEN READY
---------------------- OPTION SELECTION ---------------------
  IS TAPE NUMBER: (YDDD)
9145
  INPUT TAPE UNIT (1,2,3)!
3
----------------------- SETUP COMPLETE ----------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

  DATE PROBLEM
  DATE PROBLEM
  DATE PROBLEM
  DATE PROBLEM
;ABORT,CU2
  DATE PROBLEM
JC!!
```

Figure 23

```
CU2 PROGRAM - MAKES IM FROM IS TAPES
    REVISION CU2.1          22 MAR 83          D.J.KNECHT
-------------------------------------------------------------
      1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
      2. PRESS RETURN TO START THE RUN, WHEN READY
---------------------- OPTION SELECTION ---------------------
  IS TAPE NUMBER: (YDDD)
9040
  INPUT TAPE UNIT (1,2,3)!
3
----------------------- SETUP COMPLETE ----------------------
 PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

1030, MT00
 ABORT: TAPE READ ERROR - IST=-3
JC!!
```

Figure 24

II.D IMP PROGRAM

The IMP program is used to attempt (5 times) to salvage a hard-to-read IM tape by copying it, hoping that you might get one pass of the program to make a successful read. Also, the IMP program checks whether or not there is a parity error on an IM tape. This program takes about 2 minutes to execute.

The first question asks which is the input tape unit, that is, where the IM tape will be read ([3] in the example of figure 25). The second question asks whether to omit the copy tape or not. If one wants to write a new IM tape, then this question should be answered with a [Ø] as in figure 25. If one only wants to check the IM tape then a [1] should be entered as in figure 26, and the program will only read the IM tape. Under these conditions the program will take less than 2 minutes (probably 30 seconds) to execute since the program does not have to read a tape and write a tape, but only read a tape. The next question will ask which is the output tape unit, that is, where the IM tape will be written ([1] in the example of figure 25). Note (figure 26) that when one does not want to write a new IM tape then the question asking which is the output tape unit does not appear. If one succeeds in reading an IM tape without encountering a parity error, then the program will stop and state a successful read as in figure 26. Also, when the program cannot successfully read the IM tape on the first try, then the IM tape will be rewound and read again. This will occur up to 5 times, and if after the fifth attempt the program is unsuccessful, the program will give up the attempt.

If a tape is not an IM tape, then when it is read a message indicating the number of actual words per record will be printed as in figure 27, because the number is different from the expected 1680 words per record for an IM tape, and the program aborts itself. Also, if a parity error exists on the IM tape, then the program states BAD RECORD IS NUMBER 17 as in figure 25.

To correct a parity error on an IM tape one can use the IMP program. The IMP program can write a new IM tape and the program will respond by stating a successful read as in figure 25. Also, writing a new IM tape will be attempted 5 times and if the program fails after the fifth time, then one has to write a new IM tape from the IS tape using the CV2 program.

Finally, when a new IM tape is written with IMP, both old and new IM tapes are rewound automatically upon completion. Also, when an IM tape has been read alone it is rewound automatically upon completion.

```
PARITY CHECKER FOR IM TAPES
INPUT TAPE UNIT:  (1,2,3 FOR M1,M2,M3)
3
OMIT COPY TAPE?  (1=OMIT)
OUTPUT TAPE UNIT:  (1,2,3 BUT NOT INPUT)
1
----------TRY NUMBER 1----------
SUCCESSFUL READ ON TRY NUMBER 1
RETAIN THE ORIGINAL IM TAPE

----------END OF RUN----------
JC##
```

Figure 25

```
PARITY CHECKER FOR IM TAPES
INPUT TAPE UNIT:  (1,2,3 FOR M1,M2,M3)
3
OMIT COPY TAPE?  (1=OMIT)
1
----------TRY NUMBER 1----------
SUCCESSFUL READ ON TRY NUMBER 1
RETAIN THE ORIGINAL IM TAPE

----------END OF RUN----------
JC##
```

Figure 26

```
PARITY CHECKER FOR IM TAPES
INPUT TAPE UNIT:  (1,2,3 FOR M1,M2,M3)
2
OMIT COPY TAPE?  (1=OMIT)
1
----------TRY NUMBER 1----------
INPUT RECORD HAS 1300 WORDS
----------TRY NUMBER 2----------
INPUT RECORD HAS 1300 WORDS
----------TRY NUMBER 3----------
INPUT RECORD HAS 1300 WORDS
----------TRY NUMBER 4----------
INPUT RECORD HAS 1300 WORDS
----------TRY NUMBER 5----------
INPUT RECORD HAS 1300 WORDS
---RUN ENDED AFTER FIVE TRIES---
JC##
```

Figure 27

```
PARITY CHECKER FOR IM TAPES
INPUT TAPE UNIT:  (1,2,3 FOR M1,M2,M3)
2
OMIT COPY TAPE?  (1=OMIT)
1
----------TRY NUMBER 1----------
1030, MT01
PARITY FAILURE ON TRY NUMBER 1
BAD RECORD IS NUMBER 17
----------TRY NUMBER 2----------
1030, MT01
PARITY FAILURE ON TRY NUMBER 2
BAD RECORD IS NUMBER 17
----------TRY NUMBER 3----------
1030, MT01
PARITY FAILURE ON TRY NUMBER 3
BAD RECORD IS NUMBER 17
----------TRY NUMBER 4----------
1030, MT01
PARITY FAILURE ON TRY NUMBER 4
BAD RECORD IS NUMBER 17
----------TRY NUMBER 5----------
1030, MT01
PARITY FAILURE ON TRY NUMBER 5
BAD RECORD IS NUMBER 17
---RUN ENDED AFTER FIVE TRIES---
JC##
```

Figure 28

II.E IMC PROGRAM

The IMC program is capable of printing on the teletype screen the results of several checks made on an IM tape. This program checks the IM tape and tallies the number of missing data points for the X, Y, and Z components for each station. Also the IMC program checks whether or not a tape is an IM tape, the date on an IM tape, and whether or not there is a parity error on an IM tape. This program takes about 30 seconds to execute.

The first question asks for the Julian date. For December 27, 1983, the 361th day of the year, the correct response would be 3361 as shown in figure 29. The second question asks which is the input tape unit, that is, where the IM tape will be read ([3] in the example of figure 29). Then after the tape is read there is a printout for the X, Y, and Z components for every station giving a count of the number of missing data points. Then the program states (if true) that the IM tape is a good tape with no errors. Finally, the program automatically copies the output and rewinds the tape.

If a tape is not an IM tape, then when it is read an error of NWDS (number of words) will occur and the program aborts itself as in figure 30. The error NWDS indicates that the tape being read does not have 1680 words per record, as a good IM tape does. In figure 30 there is a pair of parentheses after the ERROR: NWDS and inside the parentheses is the actual number of words per record on the tape. The date entered for the Julian date question in the example of figure 29 was the actual date on the IM tape, thus the program was able to read the tape correctly and give a positive response. However, there might be some situations where there is a negative response. For example if for some reason one was not sure whether or not the IM tape was labeled with the correct date, then the IMC program could be used to check this problem. There are 4 possible errors associated with the Julian date that could occur as follows:

ERROR:	YEAR	=	Year value incorrect
ERROR:	NMON	=	Month value incorrect
ERROR:	JDAY	=	Day of year value incorrect
ERROR:	DOMN	=	Day of the month value incorrect

One of these errors, more than one, or all of these errors could occur at a time. Examples of these errors can be seen in figure 31. In these examples one can see that after the error message on each line there is a pair of parentheses which contains the actual number found on the tape

```
                    IM-SERIES TAPE CHECK PROGRAM
        REVISION IMC3          22 MAR 83          D.J.KNECHT
    ------------------------------------------------------------------
    JULIAN DATE: (YDDD)
3361
    INPUT TAPE UNIT: (1,2,3)
3
    -------------------------TAPE CHECK LOG-------------------------

   COUNT OF MISSING DATA POINTS
    STN 1:     259 (X)     259 (Y)     259 (Z)
    STN 2:     242 (X)     242 (Y)     242 (Z)
    STN 3:     242 (X)     242 (Y)     242 (Z)
    STN 5:    1440 (X)    1440 (Y)    1440 (Z)
    STN 7:    1440 (X)    1440 (Y)    1440 (Z)
    STN 8:    1440 (X)    1440 (Y)    1440 (Z)
    STN 9:     241 (X)     241 (Y)     241 (Z)

   GOOD TAPE - NO ERRORS
    -------------------------CHECK COMPLETE-------------------------
```

Figure 29

```
                    IM-SERIES TAPE CHECK PROGRAM
        REVISION IMC3          22 MAR 83          D.J.KNECHT
    ------------------------------------------------------------------
    JULIAN DATE: (YDDD)
3361
    INPUT TAPE UNIT: (1,2,3)
3
    -------------------------TAPE CHECK LOG-------------------------
    TRACE  1   HOUR -1   ERROR: NUDS  (     1300)
   TAPE READ PROBLEM - END OF CHECK
  JC##
```

Figure 30

```
                    IM-SERIES TAPE CHECK PROGRAM
        REVISION IMC3          22 MAR 83          D.J.KNECHT
    ------------------------------------------------------------------
    JULIAN DATE: (YDDD)
2309
    INPUT TAPE UNIT: (1,2,3)
3
    -------------------------TAPE CHECK LOG-------------------------
    TRACE  1   HOUR  0   ERROR: YEAR  (       83)
    TRACE  1   HOUR  0   ERROR: MMON  (       12)
    TRACE  1   HOUR  0   ERROR: DOMN  (       27)
    TRACE  1   HOUR  0   ERROR: JDAY  (      361)
    TRACE  1   HOUR  1   ERROR: YEAR  (       83)
    TRACE  1   HOUR  1   ERROR: MMON  (       12)
    TRACE  1   HOUR  1   ERROR: DOMN  (       27)
    TRACE  1   HOUR  1   ERROR: JDAY  (      361)
    TRACE  1   HOUR  2   ERROR: YEAR  (       83)
    TRACE  1   HOUR  2   ERROR: MMON  (       12)
    TRACE  1   HOUR;ABORT,IMC
    TRACE  1   HOUR  2   ERROR: DOMN  (       27
    TRACE  1   HOUR  2   ERROR: JDAY  (      361)
    TRACE  1   HOUR  3   ERROR: YEAR  (       83)
    TRACE  1   HOUR  3   ERROR: MMON  (       12)
    TRACE  1   HOUR  3   ERROR: DOMN  (       27)
  JC##
```

Figure 31

for either the year, month, or day. When a bad tape is encountered, one usually will want to abort the program manually after a few printed lines; otherwise the program will continue to print every error for each trace of the day page after page until it reaches the end of tape and aborts itself stating a BAD TAPE - NUMBER OF ERRORS: as in figure 32. Finally, if a parity error exists on the IM tape, then the program states that there is a TAPE READ PROBLEM and aborts itself as in figure 33.

```
 TRACE 21   HOUR 18   ERROR: YEAR  (      83)
 TRACE 21   HOUR 18   ERROR: NMON  (      12)
 TRACE 21   HOUR 18   ERROR: DOMN  (      27)
 TRACE 21   HOUR 18   ERROR: JDAY  (     361)
 TRACE 21   HOUR 19   ERROR: YEAR  (      83)
 TRACE 21   HOUR 19   ERROR: NMON  (      12)
 TRACE 21   HOUR 19   ERROR: DOMN  (      27)
 TRACE 21   HOUR 19   ERROR: JDAY  (     361)
 TRACE 21   HOUR 20   ERROR: YEAR  (      83)
 TRACE 21   HOUR 20   ERROR: NMON  (      12)
 TRACE 21   HOUR 20   ERROR: DOMN  (      27)
 TRACE 21   HOUR 20   ERROR: JDAY  (     361)
 TRACE 21   HOUR 21   ERROR: YEAR  (      83)
 TRACE 21   HOUR 21   ERROR: NMON  (      12)
 TRACE 21   HOUR 21   ERROR: DOMN  (      27)
 TRACE 21   HOUR 21   ERROR: JDAY  (     361)
 TRACE 21   HOUR 22   ERROR: YEAR  (      83)
 TRACE 21   HOUR 22   ERROR: NMON  (      12)
 TRACE 21   HOUR 22   ERROR: DOMN  (      27)
 TRACE 21   HOUR 22   ERROR: JDAY  (     361)
 TRACE 21   HOUR 23   ERROR: YEAR  (      83)
 TRACE 21   HOUR 23   ERROR: NMON  (      12)
 TRACE 21   HOUR 23   ERROR: DOMN  (      27)
 TRACE 21   HOUR 23   ERROR: JDAY  (     361)

COUNT OF MISSING DATA POINTS
 STN 1:    259 (X)    259 (Y)    259 (Z)
 STN 2:    242 (X)    242 (Y)    242 (Z)
 STN 3:    242 (X)    242 (Y)    242 (Z)
 STN 5:   1440 (X)   1440 (Y)   1440 (Z)
 STN 7:   1440 (X)   1440 (Y)   1440 (Z)
 STN 8:   1440 (X)   1440 (Y)   1440 (Z)
 STN 9:    241 (X)    241 (Y)    241 (Z)

BAD TAPE - NUMBER OF ERRORS: 2016
-------------------------CHECK COMPLETE-------------------------
```

Figure 32

```
                    IM-SERIES TAPE CHECK PROGRAM
          REVISION IM03          22 MAR 83          D.J.KNECHT
    ------------------------------------------------------------
    JULIAN DATE: (YDDD)
3361
    INPUT TAPE UNIT: (1,2,3)
3
    -------------------------TAPE CHECK LOG-------------------------
  1030, MT00
    TRACE  3   HOUR 11   ERROR: READ  (      -3)
    TAPE READ PROBLEM - END OF CHECK
  JC##
```

Figure 33

II.F CMB PROGRAM

The CMB program writes a RM tape. The RM tape is a one month tape made from all the IM tapes of a given month. The CMB program combines the IM tapes by copying one after another to make an RM tape. Also, the CMB program checks whether or not a tape is an IM tape, the date on an IM tape, and whether or not there is a parity error on an IM tape. Note, when a single IM tape is to be checked for something the IMC program should be used, not the CMB program. This program takes about 35 minutes to execute.

At the start of the program a header appears on the screen as shown in figure 34. The header includes a group of 5 instructions: mount the first IM tape on any tape unit, mount the output tape on another tape unit, check that both tape units are on line and sense switches off, set the margin control to 2 and the copy switch to autoprint on the teletype terminal, and press the return when ready to proceed.

The first question will appear asking for the name of the person executing the program and the date of execution, which should be answered so that if a problem arises, who and when the program was executed will be known. The next question will ask which is the input tape unit, that is, where the IM tapes will be read ([3] in the example of figure 34). The next question will ask which is the output tape unit, that is, where the RM tape will be written ([2] in the example of figure 34). The following question will ask for the year and month. For April 1981, the fourth month of the year, the correct response will be 81Ø4 as shown in in figure 34. The next question will ask to resume a prior run. If one does not want to resume a prior run, usually when executing the program starting with the first day of the month, then a [Ø] should be entered for this question as in figure 34. This question will be discussed further in the next paragraph. Next, a statement indicating how the RM tape should be labeled appears. Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed.

A statment will appear to mount the first IM tape and press the sign switch. The entire IM tape will be copied onto the RM tape and then the IM tape will be rewound automatically. While this is occurring there will be a beep sound about every 10 seconds. On the teletype screen will appear another command to mount the next IM tape and to press the sign switch, once this command is followed the beep sound will stop and now this IM tape will be copied onto the RM tape. This procedure will occur again and again until the entire month of IM tapes has been copied onto the RM tape. Also, at an IM tape request, the program can be aborted by pressing SS1.

```
                ONE-MINUTE TAPE COMBINER PROGRAM
          REVISION CR1.2    -    08 MAY 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE FIRST IM TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

----------------------OPTION SELECTION-----------------------
YOUR OWN NAME AND DATE OF RUN    EXAMPLE: ADAMS 01 MAY 82
ARMAND 27 AUG 33
INPUT TAPE UNIT:        (U)        1, 2, 3, FOR UNIT #1, #2, #3
3
OUTPUT TAPE UNIT:       (U)        1, 2, 3, BUT NOT THE INPUT
2
YEAR AND MONTH:         (YYMM)     EXAMPLE: 7904 FOR APR 79
8104
RESUME PRIOR RUN?       (1=YES)    TO ADD TO A PARTIAL TAPE

THE OUTPUT TAPE WILL BE RM8104
-----------------------SETUP COMPLETE------------------------
PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

--------------MOUNT TAPE IM1091 AND PRESS SIGN---------------
DAY  1 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1092 AND PRESS SIGN---------------
DAY  2 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1093 AND PRESS SIGN---------------
DAY  3 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1094 AND PRESS SIGN---------------
DAY  4 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1095 AND PRESS SIGN---------------
DAY  5 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1096 AND PRESS SIGN---------------
DAY  6 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1097 AND PRESS SIGN---------------
DAY  7 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1098 AND PRESS SIGN---------------
DAY  8 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1099 AND PRESS SIGN---------------
DAY  9 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1100 AND PRESS SIGN---------------
DAY 10 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1101 AND PRESS SIGN---------------
DAY 11 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1102 AND PRESS SIGN---------------
DAY 12 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1103 AND PRESS SIGN---------------
DAY 13 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1104 AND PRESS SIGN---------------
DAY 14 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1105 AND PRESS SIGN---------------
DAY 15 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1106 AND PRESS SIGN---------------
DAY 16 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1107 AND PRESS SIGN---------------
DAY 17 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1108 AND PRESS SIGN---------------
DAY 18 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1109 AND PRESS SIGN---------------
DAY 19 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1110 AND PRESS SIGN---------------
DAY 20 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1111 AND PRESS SIGN---------------
DAY 21 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1112 AND PRESS SIGN---------------
DAY 22 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1113 AND PRESS SIGN---------------
DAY 23 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1114 AND PRESS SIGN---------------
DAY 24 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1115 AND PRESS SIGN---------------
DAY 25 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1116 AND PRESS SIGN---------------
DAY 26 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1117 AND PRESS SIGN---------------
DAY 27 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1118 AND PRESS SIGN---------------
DAY 28 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1119 AND PRESS SIGN---------------
DAY 29 APR 81 HAS BEEN ADDED
--------------MOUNT TAPE IM1120 AND PRESS SIGN---------------
DAY 30 APR 81 HAS BEEN ADDED
---------------------COMBINED TAPE COMPLETE--------------------
LABEL THIS TAPE RM8104
-------------------------RUN COMPLETE-------------------------
JC88
```

Figure 34

If a tape that is not an IM tape is mounted and the sign switch is pressed, then the program states there is a TAPE READ PROBLEM and aborts itself as in figure 35. If an IM tape out of sequence is mounted and the sign switch is pressed, then the program states that there is an INDEXING ERROR and aborts itself as in figure 36. Finally, if there is a parity error on the IM tape, then the program states that there is a TAPE READ PROBLEM and aborts itself as in figure 37. When the program is complete it reminds one to label the RM tape and states that the run is complete as in figures 34 & 38. An important fact about this program is that when the program is complete and the teletype screen is not filled, then a copy is not made automatically; one will have to obtain a copy manually.

The case just described as shown in figure 34 is when the program is executed correctly and no problems arise. However, sometimes a problem occurs and the program aborts itself. Whenever this happens the most frequent problem is a parity error occurs in reading the IM tape as shown in figure 37. To solve this problem the IM tape should be remade. Then the CMB program is used to add the remaining IM tapes of the month to the original RM tape that was aborted. For example in figure 37 the CMB program aborted itself on day 2215, so this day had to be remade. After it is remade the CMB program is requested and all the questions are answered exactly as before, except for the question asking whether or not to resume the prior run. In this case a response of [1] is used to resume the prior run. Then another question will appear asking which day to start copying and in this case it would be day 2215 as shown in figure 38. Note (figure 34) that when one does not resume a prior run then the question asking which day to start copying does not appear. The program will read the partially complete RM tape and print all the days already written on the RM tape on the teletype screen, then will appear the command to mount the next IM tape and to press the sign switch. Thus, one can continue as before to process the month of IM tapes to complete the RM tape tape as shown in figure 38. For this program there will be one page of output as in figures 34 & 38.

```
                ONE-MINUTE TAPE COMBINER PROGRAM
        REVISION CM1.2    -    09 MAY 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE FIRST IM TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  ADAMS 01 MAY 82
ARMAND 04 SEP 84
   INPUT TAPE UNIT:       (U)      1, 2, 3, FOR UNIT M1, M2, M3
3
   OUTPUT TAPE UNIT:      (U)      1, 2, 3, BUT NOT THE INPUT
2
   YEAR AND MONTH:        (YYMM)   EXAMPLE: 7904 FOR APR 79
8209
   RESUME PRIOR RUN?      (1=YES)  TO ADD TO A PARTIAL TAPE

   THE OUTPUT TAPE WILL BE RM8209
   -------------------------SETUP COMPLETE-------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ---------------MOUNT TAPE IM2244 AND PRESS SIGN---------------
   RUN ENDED: TAPE READ PROBLEM
  JCBB
```

Figure 35

```
                ONE-MINUTE TAPE COMBINER PROGRAM
        REVISION CM1.2    -    09 MAY 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE FIRST IM TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  ADAMS 01 MAY 82
ARMAND 04 SEP 84
   INPUT TAPE UNIT:       (U)      1, 2, 3, FOR UNIT M1, M2, M3
3
   OUTPUT TAPE UNIT:      (U)      1, 2, 3, BUT NOT THE INPUT
2
   YEAR AND MONTH:        (YYMM)   EXAMPLE: 7904 FOR APR 79
8209
   RESUME PRIOR RUN?      (1=YES)  TO ADD TO A PARTIAL TAPE

   THE OUTPUT TAPE WILL BE RM8209
   -------------------------SETUP COMPLETE-------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ---------------MOUNT TAPE IM2244 AND PRESS SIGN---------------
   RUN ENDED: INDEXING ERROR
  JCBB
```

Figure 36

```
                ONE-MINUTE TAPE COMBINER PROGRAM
        REVISION CM1.2    -    08 MAY 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE FIRST IM TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION-----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  ADAMS 01 MAY 82
ARMAND 06 FEB 84
   INPUT TAPE UNIT:       (U)      1, 2, 3, FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:      (U)      1, 2, 3, BUT NOT THE INPUT
3
   YEAR AND MONTH:        (YYMM)   EXAMPLE: 7904 FOR APR 79
8208
   RESUME PRIOR RUN?      (1=YES)  TO ADD TO A PARTIAL TAPE

   THE OUTPUT TAPE WILL BE RM8208
   -------------------------SETUP COMPLETE-------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ---------------MOUNT TAPE IM2213 AND PRESS SIGN---------------
   DAY  1 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2214 AND PRESS SIGN---------------
   DAY  2 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2215 AND PRESS SIGN---------------
 1010, MT01
   RUN ENDED: TAPE READ PROBLEM
  JCBB
```

Figure 37

```
                    ONE-MINUTE TAPE COMBINER PROGRAM
      REVISION CM1.2     -     08 MAY 82     -     D.J.KNECHT
-------------------------------------------------------------------
          1. MOUNT THE FIRST IM TAPE ON ANY TAPE UNIT
          2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
          3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
          4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          5. PRESS RETURN TO START THE RUN, WHEN READY

-- ---------------------OPTION SELECTION---- ------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE: ADAMS 01 MAY 82
%%MAND 06 FEB 84
   INPUT TAPE UNIT:       (U)       1, 2, 3, FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
3
   YEAR AND MONTH:        (YYMM)    EXAMPLE: 7904 FOR APR 79
8208
   RESUME PRIOR RUN?      (1=YES)   TO ADD TO A PARTIAL TAPE
1
   FIRST IM TAPE NUMBER: (YDDD)     YEAR AND DAY
2215
   THE OUTPUT TAPE WILL BE RM8208
   -------------------------SETUP COMPLETE-------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   DAY  1 AUG 82 IS ON THE TAPE
   DAY  2 AUG 82 IS ON THE TAPE
      -----------MOUNT TAPE IM2215 AND PRESS SIGN---------------
   DAY  3 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2216 AND PRESS SIGN---------------
   DAY  4 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2217 AND PRESS SIGN---------------
   DAY  5 AUG 82 HAS BEEN ADDED
   ---------- ----MOUNT TAPE IM2218 AND PRESS SIGN---------------
   DAY  6 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2219 AND PRESS SIGN---------------
   DAY  7 AUG 82 HAS BEEN ADDED
   ---------- --MOUNT TAPE IM2220 AND PRESS SIGN---------------
   DAY  8 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2221 AND PRESS SIGN---------------
   DAY  9 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2222 AND PRESS SIGN---------------
   DAY 10 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2223 AND PRESS SIGN---------------
   DAY 11 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2224 AND PRESS SIGN---------------
   DAY 12 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2225 AND PRESS SIGN---------------
   DAY 13 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2226 AND PRESS SIGN---------------
   DAY 14 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2227 AND PRESS SIGN---------------
   DAY 15 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2228 AND PRESS SIGN---------------
   DAY 16 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2229 AND PRESS SIGN---------------
   DAY 17 AUG 82 HAS BEEN ADDED
   ----------A----MOUNT TAPE IM2230 AND PRESS SIGN---------------
   DAY 18 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2231 AND PRESS SIGN---------------
   DAY 19 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2232 AND PRESS SIGN---------------
   DAY 20 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2233 AND PRESS SIGN---------------
   DAY 21 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2234 AND PRESS SIGN---------------
   DAY 22 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2235 AND PRESS SIGN---------------
   DAY 23 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2236 AND PRESS SIGN---------------
   DAY 24 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2237 AND PRESS SIGN---------------
   DAY 25 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2238 AND PRESS SIGN---------------
   DAY 26 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2239 AND PRESS SIGN---------------
   DAY 27 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2240 AND PRESS SIGN---------------
   DAY 28 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2241 AND PRESS SIGN---------------
   DAY 29 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2242 AND PRESS SIGN---------------
   DAY 30 AUG 82 HAS BEEN ADDED
   ---------------MOUNT TAPE IM2243 AND PRESS SIGN---------------
   DAY 31 AUG 82 HAS BEEN ADDED
   --------------------COMBINED TAPE COMPLETE--------------------
   LABEL THIS TAPE RM8208
   -------------------------RUN COMPLETE-------------------------
JC$$
```

Figure 38

II.G RGN PROGRAM

The RGN program writes a RM tape, too. However, this program does not make an RM tape from IM tapes; it makes a RM tape directly from IS tapes by reading, computing minute averages, reformating the results, and writing them on a RM tape. To make a RM tape using the RGN program takes about 5 hours compared to 35 minutes using the CMB program. One may ask why then use the RGN program? The answer is in some cases IM tapes may not be available and rather than making all the IM tapes again from the IS tapes using the CV2 program and making the RM tape using the CMB program, one can directly make an RM tape from the IS tapes. In effect, the RGN program is a combination of the CV2 and CMB programs. Also, the RGN program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape.

At the start of the program a header appears on the screen as shown in figure 39. The header includes a group of seven instructions: mount the first IS tape on any tape unit, mount the output tape on another tape unit, check that both tape units are on line and sense switches off, press SS3 on tolerates parity errors on IS tapes so the program will not abort itself, press SS1 on ends a run at an IS tape request, set the margin control to 2 and the copy switch to autoprint on the teletype terminal, and press the return when ready to proceed.

The first question will appear asking for the name of the person executing the program and the date of execution, which should be answered so that if a problem arises, who and when the program was executed will be known. The next question will ask which is the input tape unit, that is, where the IS tapes will be read ([2] in the example of figure 39). The next question will ask which is the output tape unit, that is, where the RM tape will be written ([3] in the example of figure 39). The following question will ask for the year and month. For January 1979, the first month of the year, the correct response will be 7901 as in figure 39. The next question will ask for the start day of the month. For example if one is beginning at the start of an RM tape, then one will answer the question with [01] for the first day of the month as in figure 39. If for some reason a RM tape has already been partially made then one can answer this question with the next day that should be added, for example one can answer this question with [16], the sixteenth day of the month, and go on from there as in figure 40. Also, if one has a partially made RM tape and wants to complete it, then one can answer this question with [00] which will find the end of the tape and then the next day can be added as in figure 41. Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed.

```
                    RGN PROGRAM TO REGENERATE RM TAPES

                    REVISION RGN1.2    17 MAR 83    D.J.KNECHT
 ------------------------------------------------------------------------
        1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
        4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
        5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
        6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------------------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 16 MAR 83
PAULICA 17 MAR 83
    INPUT TAPE UNIT: (N)               1,2,3 FOR M1,M2,M3
2
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
3
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
7901
    START DAY (OF MONTH): (DD)         01-31, 00-FIND END OF TAPE
01
    ----------------------- SETUP COMPLETE -----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ------------ MOUNT IS0001 AND PRESS SIGN SWITCH ------------
       DAY   1 (  1 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0002 AND PRESS SIGN SWITCH ------------
       DAY   2 (  2 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0003 AND PRESS SIGN SWITCH ------------
       DAY   3 (  3 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0004 AND PRESS SIGN SWITCH ------------
       DAY   4 (  4 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0005 AND PRESS SIGN SWITCH ------------
       DAY   5 (  5 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0006 AND PRESS SIGN SWITCH ------------
       DAY   6 (  6 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0007 AND PRESS SIGN SWITCH ------------
       DAY   7 (  7 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0008 AND PRESS SIGN SWITCH ------------
       DAY   8 (  8 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0009 AND PRESS SIGN SWITCH ------------
       DAY   9 (  9 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0010 AND PRESS SIGN SWITCH ------------
       DAY  10 ( 10 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0011 AND PRESS SIGN SWITCH ------------
       DAY  11 ( 11 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0012 AND PRESS SIGN SWITCH ------------
       DAY  12 ( 12 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0013 AND PRESS SIGN SWITCH ------------
       DAY  13 ( 13 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0014 AND PRESS SIGN SWITCH ------------
       DAY  14 ( 14 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0015 AND PRESS SIGN SWITCH ------------
       DAY  15 ( 15 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0016 AND PRESS SIGN SWITCH ------------
       DAY  16 ( 16 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0017 AND PRESS SIGN SWITCH ------------
  1030, MT01
    ABORT?  1-ABORT, 0-CONTINUE

    MIN= 878: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN= 878: TAPE LEADS 1 MINUTES - WRITE A BLANK
  1030, MT01

    ABORT?  1-ABORT, 0-CONTINUE

    MIN= 365: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
  1030, MT01
    MIN= 365: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
  1030, MT01
    MIN= 365: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN= 365: TAPE LEADS 1 MINUTES - WRITE A BLANK
       DAY  17 ( 17 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0018 AND PRESS SIGN SWITCH ------------
       DAY  18 ( 18 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0019 AND PRESS SIGN SWITCH ------------
       DAY  19 ( 19 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0020 AND PRESS SIGN SWITCH ------------
       DAY  20 ( 20 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0021 AND PRESS SIGN SWITCH ------------
       DAY  21 ( 21 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0022 AND PRESS SIGN SWITCH ------------
       DAY  22 ( 22 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0023 AND PRESS SIGN SWITCH ------------
       DAY  23 ( 23 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0024 AND PRESS SIGN SWITCH ------------
       DAY  24 ( 24 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0025 AND PRESS SIGN SWITCH ------------
       DAY  25 ( 25 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0026 AND PRESS SIGN SWITCH ------------
       DAY  26 ( 26 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0027 AND PRESS SIGN SWITCH ------------
       DAY  27 ( 27 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0028 AND PRESS SIGN SWITCH ------------
       DAY  28 ( 28 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0029 AND PRESS SIGN SWITCH ------------
       DAY  29 ( 29 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0030 AND PRESS SIGN SWITCH ------------
  1030, MT01
    MIN= 332: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
  1030, MT01
    MIN= 332: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN= 332: TAPE LEADS 1 MINUTES - WRITE A BLANK
       DAY  30 ( 30 JAN 79) HAS BEEN ADDED
    ------------ MOUNT IS0031 AND PRESS SIGN SWITCH ------------
       DAY  31 ( 31 JAN 79) HAS BEEN ADDED
    ---------------------- MONTH COMPLETE ----------------------
```

Figure 39

```
                    RGN PROGRAM TO REGENERATE RM TAPES
                    REVISION RGN1.2    17 MAR 83    D.J.KNECHT
------------------------------------------------------------------------------
        1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
        4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
        5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
        6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        7. PRESS RETURN TO START THE RUN, WHEN READY

---------------------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 15 MAR 83
UNITTHER 18 MAR 83)
    INPUT TAPE UNIT: (N)               1,2,3 FOR MT1,MT2,MT3
2
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
3
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
7902
    START DAY (OF MONTH): (DD)         01-31; 00-FIND END OF TAPE
01
---------------------- SETUP COMPLETE ----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ------------- MOUNT IS9032 AND PRESS SIGN SWITCH -------------
       DAY  32 ( 1 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9033 AND PRESS SIGN SWITCH -------------
       DAY  33 ( 2 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9034 AND PRESS SIGN SWITCH -------------
  I030, MT01
    MIN=  86: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN=  86: TAPE LEADS 1 MINUTES - WRITE A BLANK
       DAY  34 ( 3 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9035 AND PRESS SIGN SWITCH -------------
       DAY  35 ( 4 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9036 AND PRESS SIGN SWITCH -------------
       DAY  36 ( 5 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9037 AND PRESS SIGN SWITCH -------------
       DAY  37 ( 6 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9038 AND PRESS SIGN SWITCH -------------
       DAY  38 ( 7 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9039 AND PRESS SIGN SWITCH -------------
       DAY  39 ( 8 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9040 AND PRESS SIGN SWITCH -------------
       DAY  40 ( 9 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9041 AND PRESS SIGN SWITCH -------------
       DAY  41 (10 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9042 AND PRESS SIGN SWITCH -------------
       DAY  42 (11 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9043 AND PRESS SIGN SWITCH -------------
       DAY  43 (12 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9044 AND PRESS SIGN SWITCH -------------
       DAY  44 (13 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9045 AND PRESS SIGN SWITCH -------------
       DAY  45 (14 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9046 AND PRESS SIGN SWITCH -------------
       DAY  46 (15 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9047 AND PRESS SIGN SWITCH -------------
    ---------------------- RUN TERMINATED ----------------------
  JC88
```

```
                    RGN PROGRAM TO REGENERATE RM TAPES
                    REVISION RGN1.2    17 MAR 83    D.J.KNECHT
------------------------------------------------------------------------------
        1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
        4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
        5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
        6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        7. PRESS RETURN TO START THE RUN, WHEN READY

---------------------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 15 MAR 83
UNITTHER 18 MAR 83)
    INPUT TAPE UNIT: (N)               1,2,3 FOR MT1,MT2,MT3
2
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
3
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
7902
    START DAY (OF MONTH): (DD)         01-31; 00-FIND END OF TAPE
16
---------------------- SETUP COMPLETE ----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    TAPE IS POSITIONED TO ADD DAY 16
    ------------- MOUNT IS9047 AND PRESS SIGN SWITCH -------------
       DAY  47 (16 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9048 AND PRESS SIGN SWITCH -------------
       DAY  48 (17 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9049 AND PRESS SIGN SWITCH -------------
       DAY  49 (18 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9050 AND PRESS SIGN SWITCH -------------
       DAY  50 (19 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9051 AND PRESS SIGN SWITCH -------------
       DAY  51 (20 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9052 AND PRESS SIGN SWITCH -------------


       DAY  52 (21 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9053 AND PRESS SIGN SWITCH -------------
       DAY  53 (22 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9054 AND PRESS SIGN SWITCH -------------
       DAY  54 (23 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9055 AND PRESS SIGN SWITCH -------------
       DAY  55 (24 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9056 AND PRESS SIGN SWITCH -------------
       DAY  56 (25 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9057 AND PRESS SIGN SWITCH -------------
       DAY  57 (26 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9058 AND PRESS SIGN SWITCH -------------
  I030, MT01
    MIN=  86: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN=  86: TAPE LEADS 1 MINUTES - WRITE A BLANK
       DAY  58 (27 FEB 79) HAS BEEN ADDED
    ------------- MOUNT IS9059 AND PRESS SIGN SWITCH -------------
       DAY  59 (28 FEB 79) HAS BEEN ADDED
    ---------------------- MONTH COMPLETE ----------------------
  JC88
```

Figure 40

```
                    RGN PROGRAM TO REGENERATE RM TAPES
                        REVISION RGN1.2    17 MAR 83    D.J.KNECHT
-------------------------------------------------------------------------------

        1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
        4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
        5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
        6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------- OPTION SELECTION ----------
    YOUR NAME AND DATE OF RUN       EXAMPLE: SMITH 15 MAR 83
PAULICA 1 APR 83
    INPUT TAPE UNIT: (N)            1,2,3 FOR MT1,MT2,MT3
1
    OUTPUT TAPE UNIT: (N)           1,2,3, BUT NOT THE INPUT
3
    YEAR AND MONTH: (YYMM)          EXAMPLE: 7904 FOR APR 79
7804
    START DAY (OF MONTH): (DD)      01-31; 00=FIND END OF TAPE
01
    ---------- SETUP COMPLETE ----------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ---------- MOUNT IS8091 AND PRESS SIGN SWITCH ----------
       DAY  91 (  1 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8092 AND PRESS SIGN SWITCH ----------
       DAY  92 (  2 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8093 AND PRESS SIGN SWITCH ----------
       DAY  93 (  3 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8094 AND PRESS SIGN SWITCH ----------
       DAY  94 (  4 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8095 AND PRESS SIGN SWITCH ----------
       DAY  95 (  5 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8096 AND PRESS SIGN SWITCH ----------
       DAY  96 (  6 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8097 AND PRESS SIGN SWITCH ----------
       DAY  97 (  7 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8098 AND PRESS SIGN SWITCH ----------
       DAY  98 (  8 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8099 AND PRESS SIGN SWITCH ----------
       DAY  99 (  9 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8100 AND PRESS SIGN SWITCH ----------
       DAY 100 ( 10 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8101 AND PRESS SIGN SWITCH ----------
       DAY 101 ( 11 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8102 AND PRESS SIGN SWITCH ----------
       DAY 102 ( 12 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8103 AND PRESS SIGN SWITCH ----------
       DAY 103 ( 13 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8104 AND PRESS SIGN SWITCH ----------
       DAY 104 ( 14 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8105 AND PRESS SIGN SWITCH ----------
       DAY 105 ( 15 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8106 AND PRESS SIGN SWITCH ----------
       DAY 106 ( 16 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8107 AND PRESS SIGN SWITCH ----------
       DAY 107 ( 17 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8108 AND PRESS SIGN SWITCH ----------
       DAY 108 ( 18 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8109 AND PRESS SIGN SWITCH ----------
       DAY 109 ( 19 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8110 AND PRESS SIGN SWITCH ----------
       DAY 110 ( 20 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8111 AND PRESS SIGN SWITCH ----------
       DAY 111 ( 21 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8112 AND PRESS SIGN SWITCH ----------
       DAY 112 ( 22 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8113 AND PRESS SIGN SWITCH ----------
       DAY 113 ( 23 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8114 AND PRESS SIGN SWITCH ----------
       DAY 114 ( 24 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8115 AND PRESS SIGN SWITCH ----------
       DAY 115 ( 25 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8116 AND PRESS SIGN SWITCH ----------
       DAY 116 ( 26 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8117 AND PRESS SIGN SWITCH ----------
       DAY 117 ( 27 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8118 AND PRESS SIGN SWITCH ----------
    ---------- RUN TERMINATED ----------
```

```
                    RGN PROGRAM TO REGENERATE RM TAPES
                        REVISION RGN1.2    17 MAR 83    D.J.KNECHT
-------------------------------------------------------------------------------

        1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
        2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SENSE SWITCHES OFF
        4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
        5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
        6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------- OPTION SELECTION ----------
    YOUR NAME AND DATE OF RUN       EXAMPLE: SMITH 15 MAR 83
WHITTAKER 1 APR 83
    INPUT TAPE UNIT: (N)            1,2,3 FOR MT1,MT2,MT3
1
    OUTPUT TAPE UNIT: (N)           1,2,3, BUT NOT THE INPUT
3
    YEAR AND MONTH: (YYMM)          EXAMPLE: 7904 FOR APR 79
7804
    START DAY (OF MONTH): (DD)      01-31; 00=FIND END OF TAPE
    ---------- SETUP COMPLETE ----------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    TAPE IS POSITIONED TO ADD DAY 28
    ---------- MOUNT IS8118 AND PRESS SIGN SWITCH ----------
       DAY 118 ( 28 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8119 AND PRESS SIGN SWITCH ----------
       DAY 119 ( 29 APR 78) HAS BEEN ADDED
    ---------- MOUNT IS8120 AND PRESS SIGN SWITCH ----------
       DAY 120 ( 30 APR 78) HAS BEEN ADDED
    ---------- MONTH COMPLETE ----------
```

Figure 41

A statement will appear to mount the first IS tape and press the sign switch. The entire IS tape will be processed and rewound, then the IM data will be written on the RM tape. While this is occurring there will be a beep sound about every 10 seconds. On the teletype screen will appear another command to mount the next IS tape and to press the sign switch, once this command is followed the beep sound will stop and now this IS tape will be processed. This procedure will occur again and again until the entire month of IS tapes has been processed into IM data and thus written onto the RM tape.

If a tape that is not an IS tape is mounted and the sign switch is pressed, then the program states that IRF (*) IS IN ERROR and aborts itself as in figure 42. If an IS tape out of sequence is mounted and the sign switch is pressed, then the program states that the JULIAN DAY IS 100 and aborts itself as in figure 43. Finally, if there is a parity error on the IS tape and SS3 is off, then the program asks whether or not to abort as in figure 44. When this program is complete it states MONTH COMPLETE as in figures 39 & 40. An important fact about this program is that when the program is complete and the teletype screen is not filled then a copy is not made automatically; one will have to obtain a copy manually. For this program there will be 1 page of output as in figure 39, however, in some rare cases (when there are many parity errors) there could be more than 1 page.

```
                RGN PROGRAM TO REGENERATE RM TAPES
          REVISION RGN1.2    17 MAR 83    D.J.KNECHT
 ------------------------------------------------------------
       1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT.
       2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
       3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
       4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
       5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
       6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
       7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------- ---------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 15 MAR 83
ARMAND 04 SEP 84
    INPUT TAPE UNIT: (N)               1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
2
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
8210
    START DAY (OF MONTH): (DD)         01-31; 00-FIND END OF TAPE
01
    ---------------------- SETUP COMPLETE ----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ------------- MOUNT IS2274 AND PRESS SIGN SWITCH -------------
    ABORT: IRF(8) IS IN ERROR
  JC88
```

Figure 42

```
                RGN PROGRAM TO REGENERATE RM TAPES
                    REVISION RGN1.2    17 MAR 83    D.J.KNECHT
-------------------------------------------------------------------------
          1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
          2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
          3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
          4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
          5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
          6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------------------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 15 MAR 83
ARMAND 07 SEP 84
    INPUT TAPE UNIT: (N)               1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
2
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
7905
    START DAY (OF MONTH): (DD)         01-31; 00=FIND END OF TAPE
01
    ----------------------- SETUP COMPLETE -----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ------------- MOUNT IS9121 AND PRESS SIGN SWITCH -------------
    ABORT: JULIAN DAY IS  100
  JCSE
```

Figure 43

```
                RGN PROGRAM TO REGENERATE RM TAPES
                    REVISION RGN1.2    17 MAR 83    D.J.KNECHT
-------------------------------------------------------------------------
          1. MOUNT THE FIRST IS-TAPE ON ANY TAPE UNIT
          2. MOUNT THE OUTPUT TAPE ON ANOTHER TAPE UNIT
          3. CHECK: TAPES ON LINE, SENSE SWITCHES OFF
          4. SENSE SWITCH 3 ON TOLERATES PARITY ERRORS
          5. SENSE SWITCH 1 ENDS RUN AT IS-TAPE REQUEST
          6. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
          7. PRESS RETURN TO START THE RUN, WHEN READY

    ---------------------- OPTION SELECTION ----------------------
    YOUR NAME AND DATE OF RUN          EXAMPLE: SMITH 15 MAR 83
ARMAND 04 SEP 84
    INPUT TAPE UNIT: (N)               1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)              1,2,3, BUT NOT THE INPUT
2
    YEAR AND MONTH: (YYMM)             EXAMPLE: 7904 FOR APR 79
7904
    START DAY (OF MONTH): (DD)         01-31; 00=FIND END OF TAPE
01
    ----------------------- SETUP COMPLETE -----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    ------------- MOUNT IS9091 AND PRESS SIGN SWITCH -------------
  1030, MT00
    ABORT?  1=ABORT, 0=CONTINUE
0
    MIN=  10: IS-TAPE PARITY ERROR - CONTINUE WITHOUT A SKIP
    MIN=  10: TAPE LEADS 1 MINUTES - WRITE A BLANK
  1030, MT00
    ABORT?  1=ABORT, 0=CONTINUE
1
    ABORT: PARITY ERROR ON UNIT 23
  JCSE
```

Figure 44

II.H TCY PROGRAM

The TCY program can make a copy of several different kinds of tapes. Also, this program can check what type of tape it is and whether or not there is a parity error on the tape read. The time required to execute this program is dependent on the number and length of records to be copied.

A question will appear asking for the format of the tape that is being read which will be copied onto a copy tape. Tape formats could be any of the following:

GE = Any number of words per record; 2 or 3 bytes per word

AR = 2560 maximum words per record; 2 bytes per word

IS = 1300 words per record; 3 bytes per word

FS = 6500 words per record; 2 bytes per word

IM = 1680 words per record; 3 bytes per word

KM = 1680 words per record; 3 bytes per word

CM = 4200 words per record; 2 bytes per word

For example in figure 45 GE is entered for this question, where any type of tape can be read. Then the following question asks for the number of words per record as in figure 45. The next question asks whether or not the record length varies. This question should usually be answered with a [Ø] in all cases as in figure 45 except when an archive tape is to be copied. Of the common tapes only archive tapes have variable length records, but GE might be used for other tapes of this type. The following question asks for the number of bytes per word ([3] in the example of figure 45). Thus, in this example of a GE tape format the tape read and copied is an IM tape with 1680 words per record, nonvariable length records, and 3 bytes per word. Note (figure 46) that whenever any tape format other than GE is requested, then the questions asking for the number of words per record, variable length records, and number of bytes per word do not appear. For example in figure 46 [KM] is entered to copy an KM tape. The second question asks for the number of records to be copied, where the total number that can be copied is 32ØØØ. Also, a [Ø] can be entered as in figure 46 to copy an entire tape. The next question will ask which is the input tape unit, that is, where the original tape will be read ([3] in the examples of figures 45 & 46). The next question will ask which is the output tape unit, that is, where the copy tape will be written ([2] in the examples of figures 45 & 46).

```
                    TAPE COPIER PROGRAM
          VARIABLE FORMAT - 6500 MAX WORDS - 2- OR 3-BYTE BINARY
          REVISION TCY1.2      -    03 MAR 84    -      D.J.KNECHT
    ------------------------------------------------------------------
    TAPE FORMAT: (FF)                    GE = GENERAL (TO BE INPUT)
                                         AR = ARCHIVE DATA
                                         IS,FS,IN,RM,CM = EDITED DATA
GE
    WORDS PER RECORD: (NNNN)             6500 MAXIMUM
1000
    VARIABLE LENGTH RECORDS?             ENTER 1 IF VARIABLE

    TAPE BYTES PER WORD: (N)             2-BYTE OR 3-BYTE BINARY
3
    NUMBER OF RECORDS: (NNNN)            32000 MAX, 0=COMPLETE TAPE
0007
    INPUT TAPE UNIT: (N)                 1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)                1,2,3, BUT NOT THE INPUT
2
    PARITY-ERROR TREATMENT: (T)          0=ABORT, 1=OMIT, 2=ENDFILE

    ----------------------SETUP COMPLETE----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    RECORD     0 HAS 1680 WORDS
    RECORD     1 HAS 1680 WORDS
    RECORD     2 HAS 1680 WORDS
    RECORD     3 HAS 1680 WORDS
    RECORD     4 HAS 1680 WORDS
    RECORD     5 HAS 1680 WORDS
    RECORD     6 HAS 1680 WORDS
    SPECIFIED NUMBER OF RECORDS WRITTEN
    TOTAL RECORDS READ (INCL EOF):     8
    ----------------------COPYING COMPLETE----------------------
  JC##
```

Figure 45

```
                    TAPE COPIER PROGRAM
          VARIABLE FORMAT - 6500 MAX WORDS - 2- OR 3-BYTE BINARY
          REVISION TCY1.2      -    03 MAR 84    -      D.J.KNECHT
    ------------------------------------------------------------------
    TAPE FORMAT: (FF)                    GE = GENERAL (TO BE INPUT)
                                         AR = ARCHIVE DATA
                                         IS,FS,IN,RM,CM = EDITED DATA
RM
    NUMBER OF RECORDS: (NNNN)            32000 MAX, 0=COMPLETE TAPE

    INPUT TAPE UNIT: (N)                 1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)                1,2,3, BUT NOT THE INPUT
2
    PARITY-ERROR TREATMENT: (T)          0=ABORT, 1=OMIT, 2=ENDFILE

    ----------------------SETUP COMPLETE----------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    RECORD     0 HAS 1658 WORDS
    RECORD     1 HAS 1665 WORDS
    RECORD     2 HAS 1689 WORDS
    RECORD     3 HAS 1664 WORDS
    RECORD     4 HAS 1694 WORDS
    RECORD     5 HAS 1685 WORDS
;ABORT,TCY
    RECORD     6 HAS 1637 WORDS
  JC##
```

Figure 46

The following question asks for the method of PARITY-ERROR TREATMENT with 3 possible responses:

Ø = ABORT

1 = OMIT

2 = ENDFILE

If a parity error exists on the original tape and one wants the program to abort itself when it reads a parity error, then a [Ø] should be entered for this question and the parity error where the tape is read will appear on the teletype screen along with the record number as shown in figure 47. If a parity error exists on the original tape and one wants simply to omit the record containing the parity error from the copy tape, then a [1] should be entered for this question (any parity error will appear on the teletype screen). If a parity error exists on the original tape and one wants to replace the record containing the parity error with an End Of File (EOF) on the copy tape, then a [2] should be entered for this question (any parity error will appear on the teletype screen). Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed.

When the program completes its execution of copying an entire tape and finds a double EOF on the input tape it will print on the teletype screen END OF INFORMATION REACHED and the number of records read as in figure 48. When the program completes execution of partially copying a tape it will print on the teletype screen the SPECIFIED NUMBER OF RECORDS WRITTEN and the number of records read as in figure 45. For this program there will be 1 page of output as in figures 45-48, unless many records are copied and the correct tape format was not entered. If a tape read is not of the format as input to the tape format question, then for every record copied the number of actual words per record will be printed on the teletype screen as shown in figure 45.

A final fact about this program is that it rewinds the original tape and the copy tape upon completion of its execution.

```
                    TAPE COPIER PROGRAM
          VARIABLE FORMAT - 6500 MAX WORDS - 2- OR 3-BYTE BINARY
          REVISION TCV1.2      -    03 MAR 84    -      D.J.KNECHT
    ------------------------------------------------------------------
    TAPE FORMAT: (FF)                    GE = GENERAL (TO BE INPUT)
                                         AR = ARCHIVE DATA
                                         IS,FS,IM,RM,CM = EDITED DATA
AR
    NUMBER OF RECORDS: (NNNN)            32000 MAX, 0=COMPLETE TAPE
0100
    INPUT TAPE UNIT: (N)                 1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)                1,2,3, BUT NOT THE INPUT
2
    PARITY-ERROR TREATMENT: (T)          0=ABORT, 1=OMIT, 2=ENDFILE

    ------------------------SETUP COMPLETE------------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

  1030, MT00
    ABORT: READ PARITY, RECORD   22
  JC!!
```

Figure 47

```
                    TAPE COPIER PROGRAM
          VARIABLE FORMAT - 6500 MAX WORDS - 2- OR 3-BYTE BINARY
          REVISION TCV1.2      -    03 MAR 84    -      D.J.KNECHT
    ------------------------------------------------------------------
    TAPE FORMAT: (FF)                    GE = GENERAL (TO BE INPUT)
                                         AR = ARCHIVE DATA
                                         IS,FS,IM,RM,CM = EDITED DATA
IM
    NUMBER OF RECORDS: (NNNN)            32000 MAX, 0=COMPLETE TAPE

    INPUT TAPE UNIT: (N)                 1,2,3 FOR M1,M2,M3
3
    OUTPUT TAPE UNIT: (N)                1,2,3, BUT NOT THE INPUT
2
    PARITY-ERROR TREATMENT: (T)          0=ABORT, 1=OMIT, 2=ENDFILE

    ------------------------SETUP COMPLETE------------------------
    PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

    END OF INFORMATION REACHED
    TOTAL RECORDS READ (INCL EOF):   44
    ------------------------COPYING COMPLETE------------------------
  JC!!
```

Figure 48

I. PM PROGRAM (Process One Minute Data)

The PM program writes a CM tape, which is readable on the CDC Cyber computer, from a RM tape. The PM program makes a number of checks on the RM tape whether or not it writes a CM tape and prints the results on the teletype screen: the number of missing data points for each component of each station for every day of the month. Also, the PM program checks whether or not a tape is a RM tape, the year and month on a RM tape, and whether or not there is a parity error on a RM tape. This program takes about 35 minutes to execute.

At the start of the program a header appears on the screen as shown in figure 49. The header includes a group of five instructions: mount the RM tape on any tape unit, mount the output tape on another tape unit, check that both tape units are on line and SS1 on if recycling, set the margin control to 2 and the copy switch to autoprint on the teletype terminal, and press the return when ready to proceed.

The first question will appear asking for the name of the person executing the program and the date of execution, which should be answered so that if a problem arises, who and when the program was executed will be known. The next question will ask whether or not to omit the output tape (the CM tape). If one does not want to make a CM tape and only wants to check the RM tape, then a [1] should be entered for this question as in figure 50. Under these conditions the program will take much less than 35 minutes (probably 15 minutes) to execute since the program does not have to read a tape and write a tape, but only read a tape. If one wants to check the RM tape and also write a CM tape, then the question should be answered with a [Ø] as in figure 49. The next question will ask which is the input tape unit, that is, where the RM tape will be read ([2] in the example of figures 49 & 50). The next question will ask which is the output tape unit, that is, where the CM tape will be written ([3] in the example of figure 49). Note (figure 50) that when one does not want to write a CM tape then the question asking which is the output tape unit does not appear. The following question will ask for the year and month. For January 1981, the first month of the year, the correct response will be 81Ø1 as shown figure 49. Next, a statement indicating how the CM tape should be labeled appears. Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed. When the program completes a good run it states the end of a good run and automatically copies. A minor problem with this program occurs when it is used for the twelfth month of the year; it appears to fail as indicated in figure 51. However, the run is assumed to be good and the problem is with the software rather than with the RM tape checked and the CM tape written. For this program there will be about 2 1/2 pages of output as in figure 49.

```
PM PROGRAM - TO PROCESS RM TAPES
   REVISION PM8.1    -    28 MAR 83    -    D.J.KNECHT
-------------------------------------------------------------
        1. MOUNT THE RM-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, $$1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  SMITH 01 APR 82
ARMAND 13 AUG 83
   OMIT THE OUTPUT TAPE? (1=YES)    FOR JM-SERIES TAPE CHECK ONLY

   INPUT TAPE UNIT:       (U)       1, 2, 3, FOR UNIT M1, M2, M3
2
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
3
   YEAR AND MONTH:        (YYDD)    YEAR AND DAY
8101
   LABEL THE OUTPUT TAPE RM8101
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------CHECK DAY 1001----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:       22 (X)       22 (Y)       22 (Z)
   STN 2:       22 (X)       22 (Y)       22 (Z)
   STN 3:       22 (X)       22 (Y)       22 (Z)
   STN 5:       22 (X)       22 (Y)       22 (Z)
   STN 7:       23 (X)       23 (Y)       23 (Z)
   STN 8:       22 (X)       22 (Y)       22 (Z)
   STN 9:       23 (X)       23 (Y)       23 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1002----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        3 (X)        3 (Y)        3 (Z)
   STN 2:        0 (X)        0 (Y)        0 (Z)
   STN 3:        0 (X)        0 (Y)        0 (Z)
   STN 5:        0 (X)        0 (Y)        0 (Z)
   STN 7:        0 (X)        0 (Y)        0 (Z)
   STN 8:        0 (X)        0 (Y)        0 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1003----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        2 (X)        2 (Y)        2 (Z)
   STN 2:        0 (X)        0 (Y)        0 (Z)
   STN 3:        0 (X)        0 (Y)        0 (Z)
   STN 5:        1 (X)        1 (Y)        1 (Z)
   STN 7:        0 (X)        0 (Y)        0 (Z)
   STN 8:        0 (X)        0 (Y)        0 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1004----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        0 (X)        0 (Y)        0 (Z)
   STN 2:        0 (X)        0 (Y)        0 (Z)
   STN 3:        2 (X)        2 (Y)        2 (Z)
   STN 5:        1 (X)        1 (Y)        1 (Z)
   STN 7:        2 (X)        2 (Y)        2 (Z)
   STN 8:        0 (X)        0 (Y)        0 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1005----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:       18 (X)       18 (Y)       18 (Z)
   STN 2:       17 (X)       17 (Y)       17 (Z)
   STN 3:       16 (X)       16 (Y)       16 (Z)
   STN 5:       49 (X)       49 (Y)       49 (Z)
   STN 7:      356 (X)      356 (Y)      356 (Z)
   STN 8:       17 (X)       17 (Y)       17 (Z)
   STN 9:       16 (X)       16 (Y)       16 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1006----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:       35 (X)       35 (Y)       35 (Z)
   STN 2:       38 (X)       38 (Y)       38 (Z)
   STN 3:       36 (X)       36 (Y)       36 (Z)
   STN 5:       35 (X)       35 (Y)       35 (Z)
   STN 7:      728 (X)      728 (Y)      728 (Z)
   STN 8:       30 (X)       30 (Y)       30 (Z)
   STN 9:       30 (X)       30 (Y)       30 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1007----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        5 (X)        5 (Y)        5 (Z)
   STN 2:        1 (X)        1 (Y)        1 (Z)
   STN 3:       10 (X)       10 (Y)       10 (Z)
   STN 5:        4 (X)        4 (Y)        4 (Z)
   STN 7:        5 (X)        5 (Y)        5 (Z)
   STN 8:        5 (X)        5 (Y)        5 (Z)
   STN 9:        4 (X)        4 (Y)        4 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1008----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        3 (X)        3 (Y)        3 (Z)
   STN 2:        1 (X)        1 (Y)        1 (Z)
   STN 3:        1 (X)        1 (Y)        1 (Z)
   STN 5:        1 (X)        1 (Y)        1 (Z)
   STN 7:       47 (X)       47 (Y)       47 (Z)
   STN 8:        5 (X)        5 (Y)        5 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1009----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        3 (X)        3 (Y)        3 (Z)
   STN 2:        0 (X)        0 (Y)        0 (Z)
   STN 3:        0 (X)        0 (Y)        0 (Z)
   STN 5:        0 (X)        0 (Y)        0 (Z)
   STN 7:        0 (X)        0 (Y)        0 (Z)
   STN 8:       13 (X)       13 (Y)       13 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1010----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        6 (X)        6 (Y)        6 (Z)
   STN 2:        2 (X)        2 (Y)        2 (Z)
   STN 3:        2 (X)        2 (Y)        2 (Z)
   STN 5:        1 (X)        1 (Y)        1 (Z)
   STN 7:        3 (X)        3 (Y)        3 (Z)
   STN 8:        0 (X)        0 (Y)        0 (Z)
   STN 9:        0 (X)        0 (Y)        0 (Z)
   GOOD INPUT DATA - NO ERRORS
   ----------------------CHECK DAY 1011----------------------
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:        7 (X)        7 (Y)        7 (Z)
   STN 8:        2 (X)        2 (Y)        2 (Z)
```

Figure 49: First of three pages.

```
STN 3:        2 (X)        2 (Y)        2 (Z)
STN 5:        2 (X)        2 (Y)        2 (Z)
STN 7:        2 (X)        2 (Y)        2 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        2 (X)        2 (Y)        2 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1012----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       17 (X)       17 (Y)       17 (Z)
STN 2:       15 (X)       15 (Y)       15 (Z)
STN 3:       16 (X)       16 (Y)       16 (Z)
STN 5:       14 (X)       14 (Y)       14 (Z)
STN 7:       15 (X)       15 (Y)       15 (Z)
STN 8:       14 (X)       14 (Y)       14 (Z)
STN 9:        5 (X)        5 (Y)        5 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1013----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       12 (X)       12 (Y)       12 (Z)
STN 2:        7 (X)        7 (Y)        7 (Z)
STN 3:        7 (X)        7 (Y)        7 (Z)
STN 5:        7 (X)        7 (Y)        7 (Z)
STN 7:        7 (X)        7 (Y)        7 (Z)
STN 8:        7 (X)        7 (Y)        7 (Z)
STN 9:        8 (X)        8 (Y)        8 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1014----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       19 (X)       19 (Y)       19 (Z)
STN 2:       16 (X)       16 (Y)       16 (Z)
STN 3:       16 (X)       16 (Y)       16 (Z)
STN 5:       14 (X)       14 (Y)       14 (Z)
STN 7:       15 (X)       15 (Y)       15 (Z)
STN 8:       15 (X)       15 (Y)       15 (Z)
STN 9:       15 (X)       15 (Y)       15 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1015----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       20 (X)       20 (Y)       20 (Z)
STN 2:        7 (X)        7 (Y)        7 (Z)
STN 3:        8 (X)        8 (Y)        8 (Z)
STN 5:        5 (X)        5 (Y)        5 (Z)
STN 7:        6 (X)        6 (Y)        6 (Z)
STN 8:        2 (X)        2 (Y)        2 (Z)
STN 9:        3 (X)        3 (Y)        3 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1016----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        6 (X)        6 (Y)        6 (Z)
STN 2:        6 (X)        6 (Y)        6 (Z)
STN 3:        9 (X)        9 (Y)        9 (Z)
STN 5:        8 (X)        8 (Y)        8 (Z)
STN 7:        7 (X)        7 (Y)        7 (Z)
STN 8:        7 (X)        7 (Y)        7 (Z)
STN 9:       20 (X)       20 (Y)       20 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1017----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        1 (X)        1 (Y)        1 (Z)
STN 2:        1 (X)        1 (Y)        1 (Z)
STN 3:        2 (X)        2 (Y)        2 (Z)
STN 5:        0 (X)        0 (Y)        0 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        1 (X)        1 (Y)        1 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1018----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        0 (X)        0 (Y)        0 (Z)
STN 2:        0 (X)        0 (Y)        0 (Z)
STN 3:        1 (X)        1 (Y)        1 (Z)
STN 5:        0 (X)        0 (Y)        0 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        1 (X)        1 (Y)        1 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1019----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        0 (X)        0 (Y)        0 (Z)
STN 2:        0 (X)        0 (Y)        0 (Z)
STN 3:        0 (X)        0 (Y)        0 (Z)
STN 5:        0 (X)        0 (Y)        0 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1020----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        1 (X)        1 (Y)        1 (Z)
STN 2:        0 (X)        0 (Y)        0 (Z)
STN 3:        0 (X)        0 (Y)        0 (Z)
STN 5:        1 (X)        1 (Y)        1 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        2 (X)        2 (Y)        2 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1021----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        6 (X)        6 (Y)        6 (Z)
STN 2:       29 (X)       29 (Y)       29 (Z)
STN 3:        3 (X)        3 (Y)        3 (Z)
STN 5:        2 (X)        2 (Y)        2 (Z)
STN 7:        1 (X)        1 (Y)        1 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        7 (X)        7 (Y)        7 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1022----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       35 (X)       35 (Y)       35 (Z)
STN 2:     1437 (X)     1437 (Y)     1437 (Z)
STN 3:       39 (X)       39 (Y)       39 (Z)
STN 5:       40 (X)       40 (Y)       40 (Z)
STN 7:       32 (X)       32 (Y)       32 (Z)
STN 8:       35 (X)       35 (Y)       35 (Z)
STN 9:      169 (X)      169 (Y)      169 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1023----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        5 (X)        5 (Y)        5 (Z)
STN 2:     1161 (X)     1161 (Y)     1161 (Z)
STN 3:        2 (X)        2 (Y)        2 (Z)
STN 5:        1 (X)        1 (Y)        1 (Z)
STN 7:        1 (X)        1 (Y)        1 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
```

Figure 49: Second of three pages.

```
----------CHECK DAY 1024----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        5 (X)        5 (Y)        5 (Z)
STN 2:        1 (X)        1 (Y)        1 (Z)
STN 3:      156 (X)      156 (Y)      156 (Z)
STN 6:        0 (X)        0 (Y)        0 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1025----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        3 (X)        3 (Y)        3 (Z)
STN 8:        1 (X)        1 (Y)        1 (Z)
STN 3:     1440 (X)     1440 (Y)     1440 (Z)
STN 5:        1 (X)        1 (Y)        1 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1026----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       11 (X)       11 (Y)       11 (Z)
STN 2:       10 (X)       10 (Y)       10 (Z)
STN 3:     1092 (X)     1092 (Y)     1092 (Z)
STN 5:       10 (X)       10 (Y)       10 (Z)
STN 7:        4 (X)        4 (Y)        4 (Z)
STN 8:       12 (X)       12 (Y)       12 (Z)
STN 9:      154 (X)      154 (Y)      154 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1027----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:       10 (X)       10 (Y)       10 (Z)
STN 8:       11 (X)       11 (Y)       11 (Z)
STN 3:       11 (X)       11 (Y)       11 (Z)
STN 5:       10 (X)       10 (Y)       10 (Z)
STN 7:        7 (X)        7 (Y)        7 (Z)
STN 8:        7 (X)        7 (Y)        7 (Z)
STN 9:        8 (X)        8 (Y)        8 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1028----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        4 (X)        4 (Y)        4 (Z)
STN 2:        1 (X)        1 (Y)        1 (Z)
STN 3:        4 (X)        4 (Y)        4 (Z)
STN 5:        1 (X)        1 (Y)        1 (Z)
STN 7:        1 (X)        1 (Y)        1 (Z)
STN 8:        1 (X)        1 (Y)        1 (Z)
STN 9:        1 (X)        1 (Y)        1 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1029----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        4 (X)        4 (Y)        4 (Z)
STN 2:        3 (X)        3 (Y)        3 (Z)
STN 3:        0 (X)        0 (Y)        0 (Z)
STN 5:        0 (X)        0 (Y)        0 (Z)
STN 7:        2 (X)        2 (Y)        2 (Z)
STN 8:        3 (X)        3 (Y)        3 (Z)
STN 9:        3 (X)        3 (Y)        3 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1030----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
```

Figure 49: Third of three pages, Continued to the top of the 2nd column.

```
STN 1:        4 (X)        4 (Y)        4 (Z)
STN 2:        5 (X)        5 (Y)        5 (Z)
STN 3:        4 (X)        4 (Y)        4 (Z)
STN 5:        6 (X)        6 (Y)        6 (Z)
STN 7:        6 (X)        6 (Y)        6 (Z)
STN 8:        6 (X)        6 (Y)        6 (Z)
STN 9:        4 (X)        4 (Y)        4 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1031----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:        3 (X)        3 (Y)        3 (Z)
STN 2:        0 (X)        0 (Y)        0 (Z)
STN 3:        0 (X)        0 (Y)        0 (Z)
STN 5:        0 (X)        0 (Y)        0 (Z)
STN 7:        0 (X)        0 (Y)        0 (Z)
STN 8:        0 (X)        0 (Y)        0 (Z)
STN 9:        0 (X)        0 (Y)        0 (Z)
GOOD INPUT DATA - NO ERRORS
----------OUTPUT TAPE COMPLETE----------
----------END OF GOOD RUN----------
```

Figure 49: Third of three pages, Continued from the bottom of the 1st column.

```
PM PROGRAM - TO PROCESS PM TAPES
   REVISION PM2.1    -    28 MAR 83    -    D.J. KNECHT
-------------------------------------------------------------------------
        1. MOUNT THE PM-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SSI ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS HUTSPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------OPTION SELECTION----------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 01 APR 82
ARMAND 26 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)   FOR JM-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:       (U)      1, 2, 3, FOR UNIT #1, #2, #3
2
   YEAR AND MONTH:        (YYDD)   YEAR AND DAY
8101
   ----------SETUP COMPLETE----------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------CHECK DAY 1001----------
```

Figure 50

```
----------CHECK DAY 1353----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:     285 (X)     285 (Y)     285 (Z)
STN 2:       9 (X)       9 (Y)       9 (Z)
STN 3:       9 (X)       9 (Y)       9 (Z)
STN 5:       9 (X)       9 (Y)       9 (Z)
STN 7:       9 (X)       9 (Y)       9 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1357----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:     840 (X)     840 (Y)     840 (Z)
STN 2:     743 (X)     743 (Y)     743 (Z)
STN 3:     743 (X)     743 (Y)     743 (Z)
STN 5:     743 (X)     743 (Y)     743 (Z)
STN 7:     743 (X)     743 (Y)     743 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1360----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    1440 (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1361----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    1440 (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1362----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    1440 (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1363----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    1440 (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1364----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
```

Figure 51: Continued to the top of the 2nd column.

```
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    144  (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1365----------
COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    1440 (X)    1440 (Y)    1440 (Z)
STN 2:    1440 (X)    1440 (Y)    1440 (Z)
STN 3:    1440 (X)    1440 (Y)    1440 (Z)
STN 5:    1440 (X)    1440 (Y)    1440 (Z)
STN 7:    1440 (X)    1440 (Y)    1440 (Z)
STN 8:    1440 (X)    1440 (Y)    1440 (Z)
STN 9:    1440 (X)    1440 (Y)    1440 (Z)
GOOD INPUT DATA - NO ERRORS
----------CHECK DAY 1366----------
TRACE  1   HOUR  0   ERROR: READ :      -21
----------RUN ENDED - TAPE READ PROBLEM----------
```

Figure 51: Continued from the bottom of the 1st column.

```
PM PROGRAM - TO PROCESS PM TAPES

    REVISION PM2.1     -     28 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE PM-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SSI ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

----------OPTION SELECTION----------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  SMITH 01 APR 82
ARMAND 11 FEB 84
   OMIT THE OUTPUT TAPE? (1-YES)    FOR PM-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:        (U)      1, 2, 3, FOR UNIT M1, M2, M3
3
   YEAR AND MONTH:         (YYDD)   YEAR AND DAY
8209
----------SETUP COMPLETE----------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

----------CHECK DAY 2244----------
   TRACE  1   HOUR  0   ERROR: MUDS :     1300)
----------RUN ENDED - TAPE READ PROBLEM----------
```

Figure 52

If a tape is not an RM tape then when it is read an error of NWDS (number of words) will occur and the program aborts itself as in figure 52. The error NWDS indicates that the tape being read is not 168Ø words per record, where 168Ø words per record is the form of the RM tape. An important consideration is that the IM tape is also of the form of 168Ø words per record so that if the PM program is used to read an IM tape it will partially work; it will read an entire IM tape of the first day of the month, but then it will fail to continue onto the next day and abort itself. The date entered for the year and month question in the example of figure 49 was the actual date on the RM tape, thus the program was able to read the tape correctly and give a positive response. However, there might be some situations where there is a negative response. For example if for some reason one was not sure whether or not the RM tape was labeled with the correct date, then the PM program could be used to check this problem. There are 3 possible errors associated with the date that could occur as follows:

ERROR: YEAR = Year value incorrect

ERROR: NMON = Month value incorrect

ERROR: JDAY = Day of year value incorrect

One of these errors, more than one, or all of these errors could occur at a time. An example of these errors can be seen in figure 53. In these examples one can see that after the error message on each line there is a pair of parentheses which contains the actual number on the tape for either the year, month, or day. Also, when an error dealing with the date occurs the program has to be aborted manually, otherwise the program will continue to print every error for each trace of the day for the first day of the month, then states a BAD TAPE NUMBER OF ERRORS: and aborts itself as in figure 54. Finally, if a parity error exists on the RM tape, then the program states that there is a TAPE READ PROBLEM and aborts itself as in figure 55.

```
PM PROGRAM - TO PROCESS PM TAPES
   REVISION PM2.1     -    28 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE PM-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE ELMR TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SSI ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

-----------------------OPTION SELECTION-------------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 01 APR 82
ARMAND 24 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)   FOR JM-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:       (0)      1, 2, 3, FOR UNIT M1, M2, M3
2
   YEAR AND MONTH:        (YYDD)   YEAR AND DAY .
8104
-----------------------SETUP COMPLETE---------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

-----------------------CHECK DAY 1091---------------------------
   TRACE  1   HOUR  0   ERROR: YEAR  (      80)
   TRACE  1   HOUR  0   ERROR: MMON  (       3)
   TRACE  1   HOUR  0   ERROR: JDAY  (      61)
   TRACE  1   HOUR  1   ERROR: YEAR  (      80)
   TRACE  1   HOUR  1   ERROR: MMON  (       3)
   TRACE  1   HOUR  1   ERROR: JDAY  (      61)
   TRACE  1   HOUR  2   ERROR: YEAR  (      80)
   TRACE  1   HOUR  2   ERROR: MMON  (       3)
   TRACE  1   HOUR  2   ERROR: JDAY  (      61)
   TRACE  1   HOUR  3   ERROR: YEAR  (      80)
   TRACE  1   HOUR  3   ERROR: MMON  (       3)
   TRACE ABORT,PM
   TRACE  1   HOUR  3   ERROR: JDAY  (      61
   TRACE  1   HOUR  4   ERROR: YEAR  (      80)
   TRACE  1   HOUR  4   ERROR: MMON  (       3)
   TRACE  1   HOUR  4   ERROR: JDAY  (      61)
  JCSE
```

Figure 53

```
   TRACE 21   HOUR 18   ERROR: JDAY  (      61)
   TRACE 21   HOUR 19   ERROR: YEAR  (      80)
   TRACE 21   HOUR 19   ERROR: MMON  (       3)
   TRACE 21   HOUR 19   ERROR: JDAY  (      61)
   TRACE 21   HOUR 20   ERROR: YEAR  (      80)
   TRACE 21   HOUR 20   ERROR: MMON  (       3)
   TRACE 21   HOUR 20   ERROR: JDAY  (      61)
   TRACE 21   HOUR 21   ERROR: YEAR  (      80)
   TRACE 21   HOUR 21   ERROR: MMON  (       3)
   TRACE 21   HOUR 21   ERROR: JDAY  (      61)
   TRACE 21   HOUR 22   ERROR: YEAR  (      80)
   TRACE 21   HOUR 22   ERROR: MMON  (       3)
   TRACE 21   HOUR 22   ERROR: JDAY  (      61)
   TRACE 21   HOUR 23   ERROR: YEAR  (      80)
   TRACE 21   HOUR 23   ERROR: MMON  (       3)
   TRACE 21   HOUR 23   ERROR: JDAY  (      61)
   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 11      105 (X)     105 (Y)     105 (Z)
   STN 21      153 (X)     153 (Y)     153 (Z)
   STN 31       89 (X)      89 (Y)      89 (Z)
   STN 51       74 (X)      74 (Y)      74 (Z)
   STN 71      412 (X)     412 (Y)     412 (Z)
   STN 81       46 (X)      46 (Y)      46 (Z)
   STN 91      670 (X)     670 (Y)     670 (Z)
   BAD INPUT DATA - NUMBER OF ERRORS: 1512
-----------------RUN ENDED - INPUT DATA PROBLEM-----------------
```

Figure 54

```
PM PROGRAM - TO PROCESS PM TAPES
   REVISION PM2.1     -    28 MAR 83     -     D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE PM-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE ELMR TAPE ON ANOTHER TAPE UNIT
        3. CHECK TAPES ON LINE, SSI ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

-----------------------OPTION SELECTION-------------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  SMITH 01 APR 82
ARMAND 24 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)   FOR JM-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:       (0)      1, 2, 3, FOR UNIT M1, M2, M3
2
   YEAR AND MONTH:        (YYDD)   YEAR AND DAY .
8003
-----------------------SETUP COMPLETE---------------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

-----------------------CHECK DAY 0061---------------------------
  1030, MT01
   TRACE  9   HOUR 11   ERROR: READ  (      -3)
-----------------RUN ENDED - TAPE READ PROBLEM------------------
```

Figure 55

II.J PS PROGRAM (Process One-Second Data)

The PS program writes a FS tape, which is readable on the CDC Cyber computer, from an IS tape. This program makes a number of checks on the IS tape whether or not it writes a CM tape and prints the results on the teletype screen: the number of missing data points for each component of every station for the whole day. Along with this output faults (errors) may occur for various minutes of the day, and these faults will be discussed in the following paragraphs. Also, the PS program checks whether or not a tape is an IS tape, the date on an IS tape, and whether or not there is a parity error on an IS tape. This program takes about 45 minutes to execute.

At the start of the program a header appears on the screen as shown in figure 56. The header includes a group of five instructions: mount the IS tape on any tape unit, mount the output tape on another tape unit, check that both tape units are on line and SSl on if recycling, set the the margin control to 2 and the copy switch to autoprint on the teletype terminal, and press the return when ready to proceed.

The first question will appear asking for the name of the person executing the program and the date of execution, which should be answered so that if a problem arises who and when the program was executed will be known. The next question will ask whether or not to omit the output tape (the FS tape). If one does not want to make a FS tape and only wants to check the IS tape, then a [1] should be entered for this question as in figure 57. Under these conditions the program will take much less than 45 minutes (probably 20 minutes) to execute since the program does not have to read a tape and write a tape, but only read a tape. If one wants to check the IS tape and also write a FS tape, then the question should be answered with a [Ø] as in figure 56. The next question will ask which is the input tape unit, that is, where the IS tape will be read ([3] in the example of figures 56 & 57). The next question will ask which is the output tape unit, that is, where the FS tape will be written ([2] in the example of figure 56). Note (figure 57) that when one does not want to write a FS tape then the question asking which output tape unit does not appear. The following question will ask for the Julian date. For April 17, 1981, the 107th day of the year, the correct response would be 81Ø7 as in figures 56 & 57. Also, at this point one has the opportunity to check that all commands were followed and questions answered correctly. If not then a [1] may be entered and the questions will be erased and the header will reappear so that one can start over. If everything is correct then one can press the return and the program will be executed. When the program completes its execution it states that the FS tape is a good tape with no errors; thus, the IS tape is a good tape because it was checked, and it automatically copies.

In the data output a common fault that occurs, even when a good IS tape is checked and/or a good FS tape is written, is the fault CONT as

```
                    ONE-SECOND TAPE PROCESSOR PROGRAM
          REVISION PS1.1     -     14 MAR 82     -     D.J.KNECHT
------------------------------------------------------------------------

        1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SS1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  JONES 15 MAR 82
ARMAND 14 FEB 83
   OMIT THE OUTPUT TAPE? (1=YES)    FOR IS-SERIES TAPE CHECK ONLY

   INPUT TAPE UNIT:       (U)       1, 2, 3, FOR UNIT M1, M2, M3
3
   OUTPUT TAPE UNIT:      (U)       1, 2, 3, BUT NOT THE INPUT
1
   JULIAN DATE:           (YDDD)    YEAR AND DAY
8107
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------TAPE CHECK LOG----------------------
   MINUTE    69    STATION 5    X COMP    FAULT: CONT  (       3)
   MINUTE    93    STATION 5    X COMP    FAULT: CONT  (       3)
   MINUTE   249    STATION 5    X COMP    FAULT: CONT  (       4)
   MINUTE   249    STATION 5    Y COMP    FAULT: CONT  (       4)
   MINUTE   332    STATION 3    Y COMP    FAULT: CONT  (       3)
   MINUTE   570    STATION 5    X COMP    FAULT: CONT  (       3)
   MINUTE   632    STATION 5    X COMP    FAULT: CONT  (       4)
   MINUTE   683    STATION 7    Y COMP    FAULT: CONT  (       4)
   MINUTE   695    STATION 1    Y COMP    FAULT: CONT  (       3)
   MINUTE   718    STATION 9    Y COMP    FAULT: CONT  (       2)
   MINUTE   821    STATION 5    X COMP    FAULT: CONT  (       4)
   MINUTE   831    STATION 8    X COMP    FAULT: CONT  (       4)
   MINUTE   976    STATION 9    X COMP    FAULT: CONT  (       6)
   MINUTE   976    STATION 9    Y COMP    FAULT: CONT  (       9)
   MINUTE   976    STATION 9    Z COMP    FAULT: CONT  (       2)
   MINUTE  1000    STATION 9    Y COMP    FAULT: CONT  (       4)
   MINUTE  1001    STATION 9    X COMP    FAULT: CONT  (       5)
   MINUTE  1001    STATION 9    Y COMP    FAULT: CONT  (       3)
   MINUTE  1146    STATION 3    Y COMP    FAULT: CONT  (       4)
   MINUTE  1168    STATION 2    Y COMP    FAULT: CONT  (       3)
   MINUTE  1314    STATION 1    Y COMP    FAULT: CONT  (       3)
   MINUTE  1350    STATION 5    X COMP    FAULT: CONT  (       3)
   MINUTE  1357    STATION 5    X COMP    FAULT: CONT  (       2)
   MINUTE  1428    STATION 2    X COMP    FAULT: CONT  (       2)

   COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
   STN 1:    6340 (X)    6340 (Y)    6340 (Z)
   STN 2:    4410 (X)    4410 (Y)    4410 (Z)
   STN 3:    5070 (X)    5070 (Y)    5070 (Z)
   STN 5:    9340 (X)    9340 (Y)    9340 (Z)
   STN 7:    3290 (X)    3290 (Y)    3290 (Z)
   STN 8:    9300 (X)    9300 (Y)    9300 (Z)
   STN 9:    4120 (X)    2690 (Y)    4120 (Z)

   GOOD TAPE - NO ERRORS
   LABEL THIS TAPE FS8107
   ----------------------PROCESSING COMPLETE----------------------
   ----------------------END OF RUN----------------------
```

Figure 56

```
                    ONE-SECOND TAPE PROCESSOR PROGRAM
          REVISION PS1.1     -     14 MAR 82     -     D.J.KNECHT
------------------------------------------------------------------------

        1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SS1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  JONES 15 MAR 82
ARMAND 25 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)    FOR IS-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:       (U)       1, 2, 3, FOR UNIT M1, M2, M3
3
   JULIAN DATE:           (YDDD)    YEAR AND DAY
8107?
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------TAPE CHECK LOG----------------------
```

Figure 57

```
                    ONE-SECOND TAPE PROCESSOR PROGRAM
          REVISION PS1.1     -     14 MAR 82     -     D.J.KNECHT
------------------------------------------------------------------------

        1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SS1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN    EXAMPLE:  JONES 15 MAR 82
ARMAND 25 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)    FOR IS-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:       (U)       1, 2, 3, FOR UNIT M1, M2, M3
3
   JULIAN DATE:           (YDDD)    YEAR AND DAY
8107
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------TAPE CHECK LOG----------------------
   MINUTE    0    STATION 0    COMP    FAULT: NODS  (    1680)
   TAPE READ FAILURE - END THE RUN
  JC88 .
```

Figure 58

in figure 56. This CONT fault is a cautionary warning only, and refers to the continuity of the data. For example if the data were plotted magnetic field (nanotesla) vs time (sec) and the slope were greater than ±5 nt/sec, then the CONT fault would be output. In figure 56 there is a pair of parentheses after FAULT: CONT, and inside the parentheses is the number of times the slope was greater than ±5 nt/sec for that minute. On a magnetically active day, many CONT faults may occur. For this program there will be anywhere from 1-10 pages of output, depending on the number of CONT faults that occur, as in figure 56. Only the CONT fault is legal; all other faults are fatal.

If a tape is not an IS tape, then when it is read a fault of NWDS (number of words) will occur and the program aborts itself as in figure 58. This fault of NWDS indicates that the tape being read is not 1300 words per record, where 1300 words per record is the form of the IS tape. In figure 58 there is a pair of parentheses after FAULT: NWDS and inside the parentheses is the actual number of words per record. The date entered for the Julian date question in the example of figure 56 was the actual date on the IS tape, thus the program was able to read the tape correctly and give a positive response. However, there might be some situations where there is a negative response. For example if for some reason one was not sure whether or not the IS tape was labeled with the correct date, then the PS program could be used to check this problem. There are 4 possible faults associated with the Julian date that could occur as follows:

FAULT: IYR = Year value incorrect

FAULT: NMO = Month value incorrect

FAULT: IDA = Day of year value incorrect

FAULT: NDA = Day of month value incorrect

One of these faults, more than one, or all of these faults could occur at a time. An example of these faults can be seen in figure 59. In these examples one can see that after the fault message on each line there is a pair of parentheses which contains the actual number that is on the tape for either the year, month, or day. Also, when a fault dealing with the Julian date occurs the program has to be aborted manually, otherwise the program will continue to print every fault for each minute of the day until it reaches the end, then states a BAD TAPE - NUMBER OF ERRORS: and aborts itself as in figure 60. Finally, if a parity error exists on the IS tape, then the program states that there is a TAPE READ PROBLEM and aborts itself as in figure 61.

```
                ONE-SECOND TAPE PROCESSOR PROGRAM
      REVISION PS1.1    -    14 MAR 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SS1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  JONES 15 MAR 82
ARMAND 25 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)   FOR IS-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:      (U)       1, 2, 3, FOR UNIT M1, M2, M3
3
   JULIAN DATE:          (YDDD)    YEAR AND DAY
9354
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------TAPE CHECK LOG----------------------
   MINUTE    0   STATION 0     COMP   FAULT: IYR  (      78)
   MINUTE    0   STATION 0     COMP   FAULT: IDA  (     107)
   MINUTE    0   STATION 0     COMP   FAULT: NMO  (       4)
   MINUTE    0   STATION 0     COMP   FAULT: NDA  (      17)
)ABORT,PS
   MINUTE    1   STATION 0     COMP   FAULT: IYR  (      78)
   MINUTE    1   STATION 0     COMP   FAULT: IDA  (     107)
   MINUTE    1   STATION 0     COMP   FAULT: NMO  (       4)
   MINUTE    1   STATION 0     COMP   FAULT: NDA  (      17)
  JC##
```

Figure 59

```
MINUTE 1436   STATION 0     COMP   FAULT: IYR  (      78)
MINUTE 1436   STATION 0     COMP   FAULT: IDA  (     107)
MINUTE 1436   STATION 0     COMP   FAULT: NMO  (       4)
MINUTE 1436   STATION 0     COMP   FAULT: NDA  (      17)
MINUTE 1437   STATION 0     COMP   FAULT: IYR  (      78)
MINUTE 1437   STATION 0     COMP   FAULT: IDA  (     107)
MINUTE 1437   STATION 0     COMP   FAULT: NMO  (       4)
MINUTE 1437   STATION 0     COMP   FAULT: NDA  (      17)
MINUTE 1438   STATION 0     COMP   FAULT: IYR  (      78)
MINUTE 1438   STATION 0     COMP   FAULT: IDA  (     107)
MINUTE 1438   STATION 0     COMP   FAULT: NMO  (       4)
MINUTE 1438   STATION 0     COMP   FAULT: NDA  (      17)
MINUTE 1439   STATION 0     COMP   FAULT: IYR  (      78)
MINUTE 1439   STATION 0     COMP   FAULT: IDA  (     107)
MINUTE 1439   STATION 0     COMP   FAULT: NMO  (       4)
MINUTE 1439   STATION 0     COMP   FAULT: NDA  (      17)

COUNT OF MISSING DATA POINTS (OF 86400 TOTAL)
STN 1:    6340 (X)    6340 (Y)    6340 (Z)
STN 2:    4410 (X)    4410 (Y)    4410 (Z)
STN 3:    5070 (X)    5070 (Y)    5070 (Z)
STN 5:    9340 (X)    9340 (Y)    9340 (Z)
STN 7:    3290 (X)    3290 (Y)    3290 (Z)
STN 8:    9300 (X)    9300 (Y)    9300 (Z)
STN 9:    4120 (X)    2690 (Y)    4120 (Z)

BAD TAPE - NUMBER OF ERRORS: 5760
-------------------------END OF RUN-------------------------
```

Figure 60

```
                ONE-SECOND TAPE PROCESSOR PROGRAM
      REVISION PS1.1    -    14 MAR 82    -    D.J.KNECHT
-------------------------------------------------------------------
        1. MOUNT THE IS-SERIES TAPE ON ANY TAPE UNIT
        2. MOUNT THE BLANK TAPE ON ANOTHER TAPE UNIT
        3. CHECK: TAPES ON LINE, SS1 ON IF RECYCLING
        4. SET MARGIN CONTROL TO 2 COLUMNS AUTOPRINT
        5. PRESS RETURN TO START THE RUN, WHEN READY

   ----------------------OPTION SELECTION----------------------
   YOUR OWN NAME AND DATE OF RUN   EXAMPLE:  JONES 15 MAR 82
ARMAND 25 SEP 84
   OMIT THE OUTPUT TAPE? (1=YES)   FOR IS-SERIES TAPE CHECK ONLY
1
   INPUT TAPE UNIT:      (U)       1, 2, 3, FOR UNIT M1, M2, M3
3
   JULIAN DATE:          (YDDD)    YEAR AND DAY
8107
   ----------------------SETUP COMPLETE----------------------
   PRESS RETURN TO CONTINUE OR ENTER 1 TO SCRATCH AND START AGAIN

   ----------------------TAPE CHECK LOG----------------------
  I030, MT00
   MINUTE   11   STATION 0     COMP   FAULT: READ  (      -3)
   TAPE READ FAILURE - END THE RUN
  JC##
```

Figure 61

END

FILMED

8-85

DTIC